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THE AMERICAN GAS-LIGHT JOURNAL AND CHEMICAL REPERTORY

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CONTENTS.

☞ An asterisk (*) denotes an illustrated article

EDITORIAL—
- The Gas Interest at the Centennial. 133
- New England Association of Gas Engineers.....133
- Naphthaline.....133
- A Suggestion.....134
- The Manhattan Company's New Scrubbers. 134

Illuminating Gas from Sewage.....134
Gas in Dublin.....134
The Public Value of a Topographical Survey.....135
Combustion of Coal Gas.....136
Annual Meeting of the New England Association of Gas Engineers.....136
Metric System of Weights and Measures.....140
Light as a Symbol.....140

CORRESPONDENCE—
- Very Gassy.....141
- Reply to Subscriber.....142
- Coal Tar.....142

CHEMICAL AND SCIENTIFIC REPERTORY—.....142
Gas-Light Intelligence.....142
Ile's Differential Compass.....143
Price of Gas.....143
Centennial Exhibition.....144
Increased Water-Supply Recommended for Philadelphia..144

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

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THE GAS INTEREST AT THE CENTENNIAL.

CENTENNIAL COMMISSION.
AMERICAN SOCIETY OF CIVIL ENGINEERS.
4 EAST TWENTY-THIRD STREET,
NEW YORK, February 2d, 1876.

SIR: It is of much importance to the gas interests of this country, that a representation of the progress of gas-lighting in America during the past century, should be made at the Centennial.

American engineers, superintendents and contractors of gas-works, desiring to contribute plans, models or drawings of gas-works or gas machinery, are respectfully notified that their contributions will be received and taken charge of by the committee of the American Society of Civil Engineers, and placed in the portion of the Centennial Buildings set apart for that purpose.

If you have plans, drawings or models you wish to contribute, please notify the undersigned at the earliest possible moment, and oblige,

Respectfully,
JAMES H. ARMINGTON,
Chairman Sub-Committee XIV,
City Gas Co., Brooklyn, N. Y.

—Or at Rooms of the Society.

NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

We publish today the report, by Geo. B. Neal, Esq., Secretary of the New England Association of Gas Engineers, of the meeting held in Boston in February last. There are some quite interesting points in the report that may be read by gas managers with profit. Mr. Sherman's account of the treatment of naphthalene in the works under his charge. Mr. Slater's sulphur tests, and Mr. Lampson's experiments, are of particular interest. With reference to the latter, it should be stated that the Boston Gas Light Company have probably got the best experimental apparatus in this country.

The retorts used consist of two benches of sixes, in the middle of a regular working range, provided with connections in such a way that, when not running experimentally, they run with the rest of the works; and when experiments are being made, they are on a practical working scale, and the heats are not unduly diminished by cold masonry or heated by neighboring fires. It is in fact a practical working. After leaving the retorts the gas is passed through a regular working system of condensers, scrubbers, and purifiers, to a small station meter, all in one room, thence to the holder. In this way the superintendent is enabled to know what can be done exactly, and the table given in the report shows the method by which results may be analyzed.

The proceedings of the Society, at their meeting, are furnished by their Secretary, whose courtesy and uniform kindness we would gratefully acknowledge.

NAPHTHALINE.

In the communication upon "Foul Lime Purification," which we published in our last, there is one point that deserves especial attention. The writer said—

There is one fact in connection with this arrangement that is worthy of notice, viz.: The sewer pipe leading to the deodorizing house is coated (on inside) to the extent of 5 or 6 inches, after a year's use, with crystallized naphthaline, which is removed by introducing a jet of steam and blowing it through by the exhauster.

Upon one occasion we filled the washer above referred to with slats, for a better distribution of water, but after deodorizing four or five boxes we were obliged to remove them, because we found that the washer was completely choked with crystallized naphthaline. This would seem to indicate that a large quantity of naphthaline is arrested by the lime in the purifiers, for there is no other source whence it could be derived during this operation.

The writer of the communication stated at the outset of his article that he merely proposed to state the *facts*, as to the means used to avoid the "foul lime nuisance," and that he did not propose to discuss the chemical theory of the matter. But it is to be regretted that, on this point of naphthaline, he had not given us more fully the theory of the chemical action connected with it. It is doubtless generally acknowledged that naphthaline is the *bete noir* of gas makers; but in the company to which the author of the article in our last issue belongs, it is a thing practically unknown, so far as street mains and services are concerned.

The only reason that can be assigned for this, is that the gradual condensation of the crude gas, before reaching the lime purifiers, brings the naphthaline, that is not taken up by the tar, to such a condition that the lime arrests the naphthaline, held in the gas, mechanically. The investigations on this subject are not yet in that exact state that any one is willing to speak very definitely and positively on the subject; but here is one positive fact stated, viz., that fresh air, drawn through the foul lime in the purifying boxes, after the lids are raised, takes out from the foul lime a large quantity of naphthaline which

is condensed or deposited in the pipes, etc., of the deodorizing apparatus.

Another fact is also established, that, after this treatment, the foul lime is robbed of its noxious odors to such an extent that it is no longer a nuisance.

It is well known that the odors of naphthaline are remarkably pungent and volatile, and it is to this fact, in a certain degree, that the offensiveness of foul lime is due; and in this, in a large measure, may be found the secret of the success attending the efforts to deodorize it, viz., the naphthaline is removed therefrom.

When naphthaline is found in the boxes it is in the form of crystals, which volatilize at about the temperature of boiling water. The drawing of the air through the boxes containing the foul lime is always attended with a considerable elevation of temperatures therein, which is proof positive that chemical action takes place. This must be an oxidizing process, but whatever it may be, the heat is sufficient to change the crystals to vapor, and in this form it is carried along by the current of air until, by washing, and contact with cooling surfaces, the naphthaline is brought down to a temperature suited to its taking the crystalline form again, when it is deposited in the pipes, etc. This was shown by the attempt to put slats or zig-zags into the washer, to better distribute the water. The cooling surface was increased, the contact with cold water was made more perfect, and the volatile naphthaline was deposited at once, and the washer "choked completely."

Removing these allowed the vapor to flow on until condensed in the cooler pipes between the washer and the deodorizing house.

The lime in the purifying-boxes acts as a sieve to the gas passing through it, and in this way the particles of naphthaline are arrested there, and the services and mains are not troubled with it. There is no doubt that as much depends upon the handling of the crude gas before it gets to the lime as anything else.

Keeping the gas in contact with tarry surfaces, and condensing it gradually, is of the first importance. As an evidence of this, see the statements of Mr. Sherman, in the report of the proceedings of the New England Society of Gas Engineers, which we print in another column. Here it is distinctly stated that an arrangement of this very kind has accomplished the desired results. There is no doubt that much more will be found out about this matter before long; and that, instead of the gas manager looking upon naphthaline as a pest, he will have found means of controlling it, and throwing it down at some convenient stage of the process, which will result in giving him a valuable residual product; so valuable, in fact, that he cannot afford to let it escape from his works, and be wasted in his mains and services.

A SUGGESTION.

In view of the fact that the American Gas-Light Association is to have no spring meeting, it is to be hoped that the business of the annual meeting will be so arranged beforehand that the utmost good will result therefrom.

As the business of manufacturing gas is likely to be a little dull this summer, it will give those in charge of works time for preparing themselves for the intelligent discussion of the various topics that are likely to come up for consideration. If each man will select one or two topics, and make a regular systematic business of collecting reliable facts, obtained from his own daily experience, with reference to them it will be surprising to many to find how much valuable information may be gathered. It is well to make full memorandums, from day to day, and these can be submitted in writing, and collated and compared afterwards.

We would suggest the following as some of the topics which might be studied and observed in the way suggested:

1st. The use of gas for other than illuminating purposes.

2nd. Deterioration of coal from exposure, from time of leaving the mines till it is used, and also the best method of handling it.

3d. Retort settings.

4th. Condensation.

5th. Purification.

6th. Distribution and service, including unaccounted-for gas.

7th. Burners and illuminating power tests.

8th. Meters.

9th. Enrichers.

Besides these there are others that might be mentioned, and that will readily suggest themselves according to the experience of the individuals. There is no more fruitful source of instruction than "accidents," and where these have occurred during the year, it is always well to report them; for the first question that naturally arises is—"What caused it?" and the study of the cause should lead to provision against any recurrence of the same in the future. If each individual member will take a little pains to post himself on some one subject—it is not likely that all will select the same one—the discussion that will result will not only be an intelligent one, but a practically useful one. Let us make the American Association second to none at home or abroad.

THE MANHATTAN COMPANY'S NEW SCRUBBERS.

In another column we state, as an item of news, that the Manhattan Gas-Light Company, of this city, has contracted for the erection of new scrubbers and condensers at their 14th Street Station, and new scrubbers at the 18th Street Station. The erection of these scrubbers will mark a new departure in gas-making in this country. It is a long step ahead, as we believe. The new works at Pittsburgh, Pa., and also at Newark, have had *similar* scrubbers put in by their engineers, and in Washington we are informed that others are about to be built, all of these being in buildings. The new scrubbers above referred to, however, are the largest yet contracted for in this country. They consist of two towers, standing side by side, having 16 feet interior diameter and 60 feet of gas way in height; they are surmounted by a room and roof containing distributing machinery and a tank for water. The interior of the towers is to be filled with trays or slats, and the gas, coming in at the bottom, passes up through these, against the water flowing down, and passes out at the top through an outlet pipe leading down the centre.

The water, as it flows to the bottom, will become stronger and stronger in ammonia; and the gas, as it passes up, is coming in contact with purer and purer water, until, at the top, it passes through clean water just before leaving the scrubber. The extreme height of the scrubbers will be 85 feet, and the novel feature, so far as our country is concerned, is that they are to stand out of doors. This has been done in England where the climate is much less severe. In order to protect them from the sudden and violent changes of temperature which we experience in this climate, each tower is surrounded with a jacket of iron, which stands off about a foot from the scrubber, and arrangements are made for ventilating or heating the air space between them, so that the temperature will be at all times under control. This arrangement was originated and designed by Mr. C. Vandervoort Smith, the Engineer of the Manhattan Company. The expense of putting up buildings, high enough to contain these towers, led to the devising of some other, and, we believe, equally good, if not better, plan.

These towers will be landmarks, and the results obtained by them will doubtless mark a new era in the much-abused business of gas-making.

This method of scrubbing is not new, but in our country this kind of "lighthouses" have usually been hidden under a building. These are to stand forth (with their jackets around them); and, for the present at least, will be the largest scrubbers in America. Some of our gas companies move slow and sure, but progress is made every time and all the time.

[Translated from "Dingler's Journal," for the AMERICAN GAS-LIGHT JOURNAL.]

By T. H. Muller.

Illuminating Gas from Sewage.

As early as 1827 Reinau produced at Berlin illuminating gas from fæces, but as the same was materially more expensive, the project fell to the ground.

Hickey, in 1870, subjected true material from sewers and closets to heat in retorts. As soon as the formation of gas ceased, superheated steam was conducted over the red-hot mass, and the hydrogen produced utilized for heating and illuminating, and the charcoal for deodorizing new material.

According to Darvin's patent (March 12, 1873) the sediment obtained by mixing lime with sewage, is dried, pulverized, and worked for illuminating gas, after having been mixed with petroleum. To the remnant in the retort is added sulphate of ammonia, and it is then sold for manure.

Lately Sindermann, in Breslau, produced gas from fæcal matter. According to a report from the commission appointed by the Municipality to examine the process, the matter is placed in small quantities in the apparatus used, two to three kilos. every 15 to 20 minutes in heated retorts. 100 kilog. fæces requires 50 kilog. coal, and produces (said to be) 7·8 to 9 cubic meters (about 35 cubic feet); by addition of one kilog. iron-turnings, 24 cubic meters gas. Besides, there is said to be produced 6·66 kilog. charcoal, suitable for use as a fertilizer; 3·33 kilog. tar; 3·34 kilog. fat, used for painting over the carrying barrels; also, large amounts of ammoniacal liquor.

Troschel found that the quality of the gas is inferior to coal gas. It is twice as expensive as coal gas, since the works have to be twice as large. The purification of the gas is very difficult, and impossible with large quantities.

According to Gintl, fæcal matter contains 92·5 per cent. water, and 1·6 per cent. ash; in order to obtain, therefore, 5·9 lbs. organic matter, suitable to produce illuminating gas, there are to be evaporated 92·5 lbs. water, which has, besides this, to be recondensed in enormous condensers; while a coal-gas works hardly uses one-half of the coke produced, the working of fæcal matter requires the supply of a large amount of fuel.

The production of a largely increased volume of gas, by addition of iron turnings and borings, can in the main only be based on the decomposition of water by red-hot iron—as

$$3Fe + 4H_2O = Fe_3O_4 + 4H_2$$
$$168 + 72 \quad 232 \quad 8$$

168 kilog. iron give 8 kilog., or 89 cubic meters; 1 kilog. iron, therefore, even if it was entirely transformed into Fe_3O_4 (which is not possible) can only give 0·5 cubic meter. The statement of Sindermann's, to be able to raise the production from 8 to 24 cubic meters, by the addition of one kilog. iron, can only be based on erroneous observations.

The ammoniacal liquor will generally only contain 0·5 per cent. ammonia; it will, therefore, be more difficult to dispose of than that from coal.

The side products—tar and the fat—appear to have little or no value. Inasmuch as the working of the different apparatus requires a large amount of labor, there is little chance of making the process a paying one.

Gas in Dublin.

The *Journal of Gas-Lighting* of February 29, thus speaks of the agitation of the gas question in Dublin:

It was the saying of Daniel O'Connell—and no Irishman, past or living, understood his countrymen so well—that, if an Irishman was to be roasted, plenty of other Irishmen would be found to stir the fire. The truth of the opinion is exemplified in the report we publish of some proceedings, taken against the Corporation of Dublin, to strike out of their accounts certain sums, paid for the supply of gas to public lamps It will be seen that the charge involved an accusation of gross fraud, on the part of the Alliance Gas Company, and one of complicity, on the part of certain officers of the Corporation. The public lamps in Dublin are supplied on the average meter system, and the allegation was, that the gas company affixed larger burners to the metered than to the unmetered lamps, and thus exaggerated the consumption. The accusation was easily disposed of. The fact that the regulators were supplied by Mr. Sugg, and were put up indiscriminately by common workmen, in the company's employ, was a complete answer to the accusation of fraud, and was at once accepted by the auditor. In truth, the public lighting in Dublin is done at an exceedingly cheap rate. The whole cost per lamp is only £2 11s. 4d. a year. Now, there are but few places in England where the charge is so low. In London the average charge is above £4 per lamp, and the gas is pretty much of the same quality as that supplied in Dublin. Probably, when all expenses have been paid, the Alliance Company do not obtain more than 2s. per 1000 for their gas, which, perhaps, leaves them something out of pocket by the transaction. The proceedings were utterly bad, and can only be accounted for by the pleasure one Irishman finds in roasting another. The Alliance Company are struggling out of their difficulties, and, in our opinion, are striving to do the best for their consumers, while endeavoring to earn some profit for the shareholders who have *invested money in the undertaking.* The Corporation of Dublin are in perennial difficulties. They have, undoubtedly, committed faults, but we should not dream of imputing dishonesty to them. In any other country, both Company and Corporation would meet with sympathy; but in Ireland they must be roasted, and there are plenty of Irishmen to stir the fire.

A word must be said on the more general complaint in Dublin of an increase in the gas bills, which has arisen since the change from twenty to sixteen candle gas made. There are so many nice points involved in the economic consumption of gas, that it is impossible here to fully discuss the matter. It stands to reason, however, that to obtain the same amount of light, much more of sixteen candle than of twenty candle gas will have to be consumed. If a whiskey drinker, with a view to economy, were to purchase weak whiskey, he would probably find, at the end of the year, that his spirit bill was not in the least diminished, inasmuch as more of the weak whiskey was required to bring him up to the point of sufficiently neglecting his business. Nay, further, a much more lavish use of the spirit might be expected, which would have the effect of increasing the yearly account. It is much the same with gas. The Dublin consumer got used to twenty-candle gas, grumbled at the price, it is true, and, at the same time, complained that he could not get enough of it. The company now supply gas of lower quality, at a cheaper rate, and keep up a plentiful supply, of which the consumer freely avails himself, and then complains that his gas bills are no less than they were before. There is no answering such people. We can only recommend the Alliance Company to continue the course they are now pursuing, and to enforce their legal rights. We shall be astonished if, in another half year, the directors do not find themselves in a position to make a further reduction of price, which may do something to allay the present uncalled-for agitation.

On March 7th the following appears on the same subject:

The fire kindled to roast the Dublin Gas Company is being vigorously stirred, and, at the same time, pumped upon. An animated correspondence is being carried on, in the Dublin newspapers, between controversialists on both sides, and we shall only interpose on one point—the test-burner question. We may roughly estimate that the open-flame burner, forced upon the company by the Corporation, costs the Dublin consumer 6d. per thousand feet. If Sugg's "London" burner had been adopted, the company might have saved ten out of the fifteen per cent. of cannel they are now compelled to use, and no ordinary customer would have discovered any difference in the gas.

The Public Value of a Topographical Survey.

At a recent meeting of the American Topographical Society, Mr. Jas. T. Gardner read a valuable paper on the subject of a topographical survey of the State of New York. He proves quite conclusively the following propositions:

First. That there can be no proper valuation of real estate, hence no equalization of taxation, till the State is provided with correct maps of its entire public and private property.

Second. That owing to the perishableness of old landmarks, and gross inaccuracies in outlines and areas described by deeds, the boundaries of a large amount of property are so uncertain as to cause serious troubles, which will become more difficult of settlement with increasing values and density of population. To remedy this, is required a survey, that, by means of a system of imperishable monuments and accurate measurements, shall establish permanently the present lines between adjoining owners and States; so that each may know exactly what and how much he has, and be furnished with official maps.

Third. To prevent the waste now in progress by successions of special surveys to meet each new need, it is desirable that the State make one general survey, of such accuracy that the maps may be used by engineers for planning and estimating the cost of public works, such as the laying-out of towns, villages, roads and railroads; drainage-systems for improving the health of our great marshy districts, and increasing the value of agricultural lands; water-supplies for towns and factories; and nameless minor wants of a developed civilization.

Fourth. A detailed topographical survey is the necessary preliminary basis for a scientific examination of the State's natural resources. Without it we cannot know nor represent the distribution of rainfall, evaporation, water-power, woods and plants, soils, clays, coal, irons, gypsum, &c.

With an exact knowledge of climate and surface conditions of the State, it would be possible to predict the regions where each different crop would flourish best. So the geologist, having determined the position of each underlying stratum in its relation to the surface, could tell when and at what depths to search for many valuable deposits.

Prof. Benj. Pierce, the former Superintendent of the United States Coast Survey, states to the legislature of Massachusetts (House Doc. No. 40, 1875), that the most expensive coast-survey work cost $150 per square mile, or about 23½ cents per acre. Since the State of New York has 47,000 square miles, it would not therefore be safe to estimate the total cost of a survey at less than $6,000,000, and the time necessary for completion at less than fifteen years. It will certainly take three years to organize and train the corps of surveyors sufficiently to expand the work to its proper scale. An expenditure of $20,000 the first year, $50,000 the second and $100,000 the third would be about the rate at which money would be required.

Though the work will be equally accurate over the whole State, it will necessarily be far more detailed, and consequently most costly, in thickly settled regions, where also accruing benefits will be greatest. In general the cost will be proportional to the value of land; so that taxes for maintaining the work will fall heaviest where most work is done, and most benefit given.

The gross amount of money may seem large; but when it is remembered that we have just sunk $6,000,000 in building basement stories for the State Capitol; that $2,000,000 of taxes are probably annually falling upon the wrong people; that thousands are wasted in costly disputes over questions of boundaries; and that deeds do not describe within ten per cent. the acres of land actually conveyed, surely $6,000,000 is not too much to spend in fifteen years to render tenure secure and taxation just upon real estate worth four thousand millions of dollars ($4,000,000,000).

He recommends that the survey be made with all the accuracy of the United States coast-survey methods, in order that the result may obtain the entire confidence of the public, and be final in the settlement of all questions at issue. Among the details it is advised that,—

The determination of all positions must be done with the exactness of the best coast-survey work; and the horizontal contours, or line of equal elevation by which surface form is shown, must never in the improved parts of the State be over twenty feet apart vertically, and sometimes ten, or the maps will be useless to practical engineers and geologists.

Concerning the cost of the work, Mr. Gardner says:

This cannot be exactly estimated until a reconnoissance has been made, and the ability of the superintendent tested. The cost may be lessened. twenty per cent. by his superior skill and energy

There are about fifteen million improved acres in the State, of which the survey must be prepared to furnish plats on a scale of 1-2500 th, or about one inch to two hundred feet. Our towns that now have tax-maps use this scale for the farm lands, and fifty or one hundred feet to the inch for village and city lots.—*The American Architect and Building News.*

Combustion of Coal Gas.

Sir: I shall esteem it a great favor if you will allow me to make a few remarks on Mr. Wallace's very instructive lecture, which I much regret not having heard.

I know from experience that the plan Mr. Wallace describes of causing the products of combustion to pass away from the bottom instead of the top of the apparatus to be warmed, is a good one, for I have for some time used a cooking-stove and a bath boiler, both constructed on this arrangement, and both answer admirably.

Mr. Wallace's cap atmospheric burners seem to be nearly perfection, and I should have been glad if he had said where they can be bought. But leaving these details, I should much like, if space allows, to say a little on the general subject. I agree with Mr. Wallace that the time is coming when gas will be the only fuel used in the metropolis, for all purposes. The chairman expressed some fear as to the enormous amount of coke which would be produced if gas were to supplant ordinary fuel in all cases. Of couse, if more coke was made than the market could absorb, it would cause loss. But why must there be so much coke made? At present, in making gas, the operation is stopped when the cream of the illuminating gas has been extracted—the calorific gases are left in the coke—but if gas consuming appliances were sufficiently perfect, these calorific gases might be utilised, and the operation of gas making might go on until nearly the whole of the coal is converted into gas. The illuminating and the calorific gases should both be extracted from the coal, stored seperately, and sent along separate sets of mains and pipes, to be used in our houses and elsewhere, each for their own purposes. That this will happen before the government of London makes the gas for London is not probable. We ought to have, and might have, a smokeless London, and it is an object worth trying for, and I think the day is being brought nearer by every exposition of the qualities of gas flames, such as Mr. Wallace has just given in your lecture-room—I am, &c.,

—*Jour. Soc. Arts.* T. M. Gisborne.

Annual Meeting of the New England Association of Gas Engineers.

The Annual Meeting of the New England Association of Gas Engineers was held at the Tremont House, Boston, on the sixteenth day of February, A. D., 1876, and continued, by adjournment, during a portion of the following day.

At twelve o'clock, noon, the President, George D. Cabot, Esq., of Lawrence, Mass., having taken the chair, and called the meeting to order, made a brief address of welcome to the members of the Association, and then announced that the meeting was open for business.

The roll was then called by the secretary, and about forty members answered to their names. The whole number present at some time during the meeting was fifty.

Before commencing the reading of the record, the Secretary stated that the proceedings of the last meeting of the Association had been published in the American Gas-Light Journal, copies of which he had caused to be sent by mail to every member.

Voted—That the reading of the record be dispensed with, and that the same be approved.

Secretary—I have here a list of all the gas-light companies in the New England States, numbering 120—15 in Maine, 11 in New Hampshire, 6 in Vermont, 65 in Massachusetts, 8 n Rhode Island, and 15 in Connecticut.

I have, for the purpose of enlarging our membership, sent circulars to the superintendents of those gas companies in New England, not already represented in this Association, asking them to allow their names to be presented to this meeting to be acted upon for admission to membership. I have received replies from several thus addressed, signifying their willingness to join the Association.

Some of these gentlemen are near by, awaiting our decision, and their names, with those of other applicants, will be presented by the Board of Directors for your consideration.

We have now on our roll sixty-four names of members, representing fifty-five gas-light companies in the New England States, and one of an original member who, at the time of the organization of the Association, was engineer of a company in Rhode Island, but who now is connected with a company in New York State.

The list referred to is on the Secretary's table, and is subject to your inspection.

The following named gentlemen, being recommended for membership by the Board of Directors, were duly elected, viz.:

W. K. Stratton	Supt.	Haverhill Gas	Co.	Mass.
H. A. Attwood	"	Dedham	"	"
J. H. Rollins	"	Worcester	"	"
B. F. Bass	"	Quincy	"	"
W. Medcalf	"	Ware	"	"
E. Keith	"	Taunton	"	"
L. W. Wells	"	Marblehead	"	"
W. W. West	"	Exeter	"	N. H.

On recommendation of individual members of the Association, the following named gentlemen were also admitted to membership, viz.:

R. J. Monk	Supt.	South Boston Gas	Co.	Mass.
M. A. Howe	"	Leominster	"	"
W. H. Bradley	"	Winsted	"	Conn

The Treasurer then presented and read his annual report, by which it appeared that the balance in cash on hand at the date of the last report was $695 31
Since rec'd for fees of membership..... 270.00

$965.31

Paid out sundry bills, specified in said report, amounting to..... 175.08

Balance..... $790.23

Voted—That the chair appoint a committee of two to audit the Treasurer's accounts. Messrs S. G. Stiness and David Moore were appointed as that committee, and retired to examine said accounts.

Mr. W. W. Greenough—I think it would tend to facilitate business to vest the president with power to appoint an auditing committee for the ensuing year as then the committee could examine the accounts beforehand, and be ready to report at the next annual meeting.

On motion it was—

Voted—That the president be authorized to appoint a committee of two, who shall audit the treasurer's account for the ensuing year, and report at the next annual meeting.

Secretary—I have received a letter from Mr. H. B. Field, of Waterbury, Conn., in which he has signified a desire to withdraw from the Association, not having time to avail himself of its privileges.

Voted—That he have leave to withdraw from the Association.

The President stated that the next business was the election of officers for the ensuing year; whereupon, it was voted that a committee of six be appointed by the President to nominate a list of officers to be balloted for.

The president then announced the following named gentlemen as the committee, viz.:

Messrs. Dwight, Perry, Harbison, Armington, Gibson and Nettleton; and they retired for consultation.

Mr. Greenough, Treasurer of the Boston gas-light company, said he would take this opportunity to extend a cordial invitation to all the members of the Association to visit the works of the Boston Gas-Light Company, where he would be pleased to meet them at such time as might suit their convenience.

On motion it was voted to accept the invitation, and visit the works at 9 o'clock to-morrow morning.

The secretary read a letter from Mr. John M. Hill, regretting that he would not be able to attend the meeting of the Association, and expressed the hope that it would be a very pleasant and profitable gathering.

The Secretary also read a letter from Mr. C. A. Gerdenier, in which he stated that a previous engagement prevented him from attending. He also writes—"I am still working the Forstall method of purification, and I will give you the way I treat it: 1st, we measure out 116 bushels of dry slacked lime, then we add about three-quarters of a gallon of water to every bushel of lime, and mix it up well; then we cover it up with canvas for three days, more or less, as the occasion may require; then, when we are ready to use it, we add one quarter of a gallon more of water, and it will purify, on an average, 10,000 feet per bushel of *prepared lime*. My friend, Mr. Slater, once asked me if the lime would hold out after being prepared. I answered, emphatically, no; it falls short on every *twenty* bushels of dry lime, *two* bushels. On every 116 bushels dry lime we use, it measures 105 bushels as the lime goes into the purifier. Our gas made in 1875 was 23,000,000 feet; yield per pound of coal, 4·67 feet. Difference between made and sold, 13 per cent. I cannot get down to five or six per cent., nor do I believe others do it honestly. Gas purified 8,241 feet to the bushel of lime. Yield per ton of coal, 10,470 feet."

Voted—That this and the other letters read by the secretary be placed on file.

A notice from Col. Armington, chairman of subcommitte XIV, of the American Society of Civil Engineers, was read, inviting gas companies to send any plans, models, or drawings of gas-works, or gas machinery, showing the progress of gas-lighting in America during the past century, which will be received and taken charge of by a committee of the American Society of Civil Engineers, and placed in that portion of the Centennial Buildings set apart for this purpose.

Mr. Dwight, for the committee appointed to nominate a list of officers for the ensuing year, made a report recommending the election of the following-named gentlemen, and they were duly elected by ballot, viz.:

President	Geo. D. Cabot, Lawrence,	Mass.
Vice President	O. E. Cushing, Lowell,	"
" "	S. G. Stiness, Pawtucket,	R. I.
Directors	J. M. Hill, Concord,	N. H.
"	Jas. H. Armington, B'klyn,	N. Y.
"	W. A. Stedman, Newport,	R. I.
"	F. C. Sherman, New Haven,	Conn.
"	W. H. Perry, Bangor,	Me.
Secy. & Treas.	Geo. B. Neal, Boston,	Mass.

Upon the announcement of the election of the several officers, the president said he had certainly hoped that he should be relieved by the election of some gentleman who was more competent to fill the position of President of the Association; but since such unanimity of feeling had been shown in his nomination and election, he felt that he must ignore his own feelings and accept the situation; and he wished to thank the members of the Association for this renewed expression of their favor, and would endeavor to discharge the duties of the office to the best of his ability.

On motion of Mr. Cushing, Messrs. Dwight and Neal were appointed a committee to make arrangements for a dinner for the members of the Association, each member to pay his own fare.

Mr. Harbison moved that the constitution and bye laws be so amended that the offices of Secretary and Treasurer may be filled by two persons instead of one.

The president stated that if the Association thought this change a proper one to be made, it would be necessary to amend the constitution, as it now clearly provides that one person shall fill both offices; and that section XIII of the constitution specifies that "at least one fortnight's notice shall be given of any proposed change."

Mr. Harbison then moved that the matter be referred to the board of directors, which was carried.

Mr. Gerould moved that the annual assessment be reduced to three dollars.

The secretary stated that the amount of the annual assessment was fixed by the board of directors, as

provided in the constitution. The first year it was fixed at ten dollars, and, at his suggestion, it was reduced after that time one-half. Nearly all the members have now paid the assessment for the ensuing year, and he thought the Association could use the money to great advantage.

Col. Armington—I hope the matter will be deferred until we hear from the finance committee. Might we not ask Prof. Chandler, or some other scientific gentleman, to come here and give us the benefit of his knowledge relating to our specialty? I think we can find ways in which to spend our money greatly to the benefit of every member of the Association. I think the assessment of five dollars a year is small enough.

The early members paid ten dollars. I hope before we reduce our tax the Directors of this Association will have the matter before them for consideration.

The president stated that the directors had an informal meeting a fortnight ago, and they then decided to try to secure some scientific gentleman to give a lecture this evening. After a number of attempts, finding several who were called upon engaged in other directions, for want of time we abandoned it.

Mr. Gerould then withdrew his motion.

Mr. Stiness, of the committee appointed to examine the Treasurer's account, reported that they had performed the duty, and found the accounts correct. The balance on hand is $790·23. This amount would be increased by the annual assessments collected to-day. The treasurer should have funds on hand to settle all current expenses, and as there would still be quite a large amount left, the committee recommend that the sum of five hundred dollars be invested for the Association, under direction of the president.

The report was accepted.

Mr. Cushing moved that a finance committee be appointed, and authorised to invest such amount as they may deem advisable. We have, in round numbers on hand to-day, one thousand dollars. The committee of two or three, perhaps with the treasurer, should be authorized to invest such amount of the funds on hand as they may deem right and proper. I would strike out the amount and appoint a committee of two.

Mr. Coggshall moved that the president and treasurer be that committee.

Mr. Cushing said he would withdraw his motion.

The president said he understood the gentleman to mean that all moneys not needed for immediate use, be invested in the name of the Association, under advice of a finance committee and the treasurer.

Mr. Harbison said he would have the vote read that the treasurer of the association be authorized, under the advice of the finance committee, to invest all moneys, from time to time, as in their judgment may be for the interest of the Association.

Mr. Coggshall's motion being withdrawn, Mr. Harbison's resolution passed.

Mr. Dwight moved that the president and Mr. Slater be the finance committee.

Col. Armington moved to amend that motion, by adding Mr. Dwight, and as thus amended, it was passed.

Mr. Slater exhibited eight sulphur tests. In explanation, he said these tests were made from gas collected, in pint bottles having ground glass stoppers, from the inlet and outlet pipes of each purifier, showing the condition of the gas at the several points during its progress through the purifiers, the amount of work each purifier was doing, and, also, that after a certain amount of gas has passed through a purifier, the lime would not only cease taking up more sulphur, but would still go on absorbing carbonic acid, which would liberate a portion of the sulphur already taken up by the lime; and thus going forward, the gas, at its exit from the purifier, would be found to contain more sulphur than when it entered.

These tests were made by tapping the inlet and outlet pipes of each purifier, introducing small pipes with stop-cocks attached, and taking samples of the gas, both before entering and after leaving each purifier, immediately after turning the center seal, and just before the next change, using a solution prepared by mixing thirty-two parts of distilled water with one part of saturated solution of acetate of lead. Having carefully collected a sample of gas, as before stated, introduce two ounces of the prepared solution, which, when shaken, will precipitate the sulphur contained in the gas; and, after filling up the bottle with water, it will show by its color the varying conditions of the gas at the several points during its progress through the purifying apparatus.

Col. Armington—I move a vote of thanks to Mr. Slater for his interesting exhibition and application of his sulphur tests.

The motion was carried.

Mr. Sherman—I believe that, in order to make our meetings interesting and profitable, it is incumbent upon each member of the Association to present such observations, facts, and experiments as have occurred to him in the management of his works, and which he has reason to suppose will interest his associates, to the end that there may be a comparison of methods and results.

With this end in view, and with the aid of these drawings, I propose to call your attention to what has been accomplished by the New Haven Gas Co., in removing naphthaline from their gas, previous to my taking charge of their works. With their practice of working their retorts with high heats and light charges, they were excessively annoyed with naphthaline. In 1874 their superintendent set about finding a remedy for this serious and growing evil, having become convinced that if the gas could be kept sufficiently long in contact with the oil and tar generated by distillation of the coal, the naphthaline would become absorbed, or disposed of, so that its presence in the gas would not be troublesome. The question to be solved was, what mechanical device can be employed to accomplish this desirable result? The apparatus finally adopted (represented by one of these plans before you) was invented by William Farmer, Esq., and it has accomplished all that was claimed for it by the inventor. The gas was passed through this apparatus for the first time at the New Haven Gas Works in October, 1874. The complaints arising from the presence of naphthaline in mains and services at once began to grow less and less, and during the spring and autumn of the following year there was scarcely any complaint from that cause. It is not claimed that this is the only method or the best, to accomplish the purpose for which it was designed. But the success attending its use by the New Haven Gas Co. shows that the principles involved in its construction, that of keeping the oil and tar etc. in close contact with the gas for as long time as possible, and until the gas is thoroughly cooled and condensed, is a correct one. Now, the question occurs, what is the most simple, compact, and least expensive apparatus as yet designed and put into practical use, to accomplish the removal of naphthaline, or to render it perfectly harmless in the gas? I believe we are on the threshold of a new era in the treatment of illuminating gas, after it leaves the hydraulic main, and before it reaches the purifiers, whether by condensing, washing, or otherwise, and I have reason to think that the present expensive and clumsy apparatus now in use in our gas works will soon give way to something much more compact and inexpensive, which, while it will be simple in construction, will be very effective in operation and results. I now present for your examination a drawing of an apparatus to remove tar, ammonia, and naphthaline from gas as it comes from the retorts, the invention of G. W. Edge, Esq. of the Jersy City Gas Works, to whom we are under great obligation for many useful improvements he has made in machinery employed in the manufacture of gas, among which may be mentioned his admirable method of removing carbon from retorts. The apparatus represented by these drawings is doing great service in his works and promises great results.

Col. Armington—I agree with Mr. Sherman in all what he has said in regard to this apparatus. I know from their experience at the Jersey City Works, that this simple device has entirely removed the naphthaline trouble at the works, and in the mains and services. Heretofore there has been used as a preventive a large quantity of cannel, crude petroleum, naphtha, etc. Some engineers in New York have volatilized naphtha by some process and passed that into their mains, after their gas had come from their holders, to dissolve the naphthaline. That involves a considerable outlay of money. Some have built separate boxes and used naphtha to pass their gas through. Here is a simple, plain thing. All of you who know Mr. Edge, know him to be a very modest man. He would hardly come out and show his inventions. There is no doubt that it can be adopted by any one. I think it is well worth consideration.

Mr. Sherman—Mr. Edge told me that he used much less lime in his purifying boxes than before the application of this apparatus.

Col. Armington—Those of you who read the American Gas-Light Journal, have probably seen in that paper an account of an accident which occurred at one of our gas works, which resulted in the temporary stoppage of the pumps which supplied the washers with ammoniacal liquor, and the result was that the quantity of gas purified per bushel of lime decreased very considerably, and the lime came from the purifiers in a half spent state. It was found, although pure water from the city was used in excess, that ammonia was absorbed so rapidly, that the gas was not purified as well as before. The pumps having been put in order and the washing with ammoniacal liquor resumed, ammonia passed into the purifyers, so that the purification was brought up to the former standard.

Four or five years ago Prof. Silliman said to me that he was satisfied from experiments he had made, and also from the experience of other chemists, that the presence of ammonia assisted in purification, and that he thought it was not detrimental to the gas. The facts that have come under my own observation strengthen belief in this matter. The presence of a certain amount of ammonia assists in removing sulphur and carbonic acid. In the case I referred to, when a large shower of water was introduced, so that the ammonia was all absorbed, the lime came from the purifiers in a half spent state. When washing with the ammoniacal liquor was again resorted to, using about fifteen gallons to the ton, the work was done as before.

Mr. Sherman—This gentleman referred to by Col. Armington has changed his mind quite recently. In October last I asked him if he thought it would be advisable to use ammoniacal liquor in washing gas. He said No, if you wish to use the liquor; said it did not pay to rig up a pump unless you want to utilize the liquor and bring it up to a standard sufficiently high to make sulphate of it.

On motion of Mr. Cushing, the thanks of the meeting were tendered to Mr. Sherman for his interesting and instructive statements, and for the plans presented by him.

The president invited Mr. Lamson, superintendent of the Boston Gas Works, to give an account of some of the very valuable and exhaustive tests made by him lately in his new experimental works, together with the conclusions he may have arrived at from the results of these tests.

Mr. Lamson—I will merely state to the gentlemen, that during the last year a very complete experimental works has been erected at the Boston Gas Works, in which I have tried many experiments, which can be better explained or described in the works themselves than here. If the gentlemen should decide to go to our works to-morrow, we shall be very happy indeed to show them the books which contain the details of all our experiments. The apparatus is capable of receiving the gas from twelve clay retorts. I have made some experiments to show the quantity and quality of gas produced from the Penn coal during each half hour of distillation, and the estimated quality of the aggregate amount produced up to end of each half hour. The following are two of the experiments:

Test of 2,400 pounds of PENN COAL; 12 Clay Retorts; Charge, 200 pounds each; Duration, four Hours; Retort Valves open; One-quarter inch Pressure on Retort

Feb. 18, 1876. Hour.	Meter.	Gas Made each half hour.	Test of each half hour's candle power.	Make per pound in cubic feet.	Calculated candle power of total gas at end of each half hour.	Inlet Condenser. Degrees F.	Outlet Condenser. Degrees F.	Washer. Degrees F.	Meter, degress F.
3									
3 30	193	1930	19 60	.8	19.60				
4	440	2470	17.07	1.83	18.17	95°	66°	52°	65°
4 30	654	2140	15.73	2.72	17.37				
5	842	1880	12.26	3.50	16.23	91°	69°	50°	66°
5 30	1009	1580	10.79	4.17	15.37				
6	1134	1340	6.88	4.72	14.37	92°	69°	50°	65°
6 30	1210	760	2.91	5.04	13.65				
7	1234	240	1.5	5.14	13.41	76°	66°	54°	65°
		12340							
Feb. 23, 1876.									
9 30									
10	180	1800	19.60	.75	19.60	66°	66°	54°	65°
10 30	400	2200	17.95	1.66	18.69				
11	600	2000	15.34	2.50	17.57	81°	67°	54°	65°
11 30	774	1740	14.06	3.23	16.78				
12	935	1610	10.80	3.89	15.75	78°	67°	52°	66°
12 30	1068	1330	10.	4.45	15.03				
1	1170	1020	4.48	4.87	14.11	72°	67°	54°	66°
1 30	1227	570	2.	5.11	13.55				
		12270							

Trials have been made in which the seal of the dip-pipe in the hydraulic main has been varied from three quarters of an inch to two and a half inches. In others the gas has been passed to the hydraulic main, independent of seal, by means of retort valves placed on the dip-pipe. As the trials are going on still, we do not feel at the present time prepared to give an opinon as regards the comparative value of the two processes. The general indications, however, seem to be—if the pressure on the retort is kept evenly at one quarter of an inch, the results, when working through a small seal, do not differ materially from those in which the gas is passed to the hydraulic main, free of seal. The candle power in the latter case being a trifle better, while the yield is a fraction smaller. But when the seal is increased beyond three quarters of an inch, there seems generally to be a decrease both in quantity and quality, although in a few special cases the yield was as large when the gas was drawn through a two and one half inch seal, as in any case when retort valves were open.

Col. Armington—What kind of coal was used?

Mr. Lamson—It was Penn coal in lumps, or in very good condition. Have made all the way from 4.75 to 5½ feet and over, according to conditions; but in case of these very large yields, the candle power was of course exceedingly low. The large yield was produced by intense heats, a rivalry was created between firemen, and retorts were at times brought to a white heat. We tried one curious experiment, as follows: Retorts were run under half inch vacuum; yield 6.38 cubic feet to the pound, of 10.91 candle gas; air was of course drawn in.

Col. Armington—Your experiments would hardly warrant saying you could produce 12,000 feet that would give a light equal to 16 candles.

Mr. Lamson—No, sir, we should not want to say that. I said that during the last part of the time the gas was almost without illuminating power. I have produced as high as 5.70 to the pound, but only under nice conditions could it be obtained, and, of course the candle power was correspondingly low.

Col. Armington—I understand you to say you run under a seal of two and a half inches, and the pressure at the stand pipe was only one quarter of an inch.

Mr. Lamson—Two and one half inches dip-seal. The retort valves being open, the gas passing to the hydraulic main independent of seal, the exhauster running to give one quarter of an inch pressure on retort. Another thing, in some of the cases, when the retorts were so very hot, and such an enormous yield was produced, we got no coal tar, or water deposit, in our hydraulic main. It is, as I said before, very hard to read a list of experiments which are all figured, but if the gentlemen will visit our office, we will be glad to show our details of trials.

Col. Armington—I think it is a very valuable fact to know, for it is one of those things that sets the directors and presidents of our gas companies, who are looking after profit, to thinking that their engineers or superintendents don't understand their business, to have a man come forward and state something that is not true; that he can extract 10,500 or 12,000 feet of 17 or 19 candle power. We have all made experiments, and we know that all these stories which we hear that any man can take out of the coal such an amount of illuminating power as they talk about are not true. It will not average over 11 candles. I think any gentleman who has an experimental apparatus will find that it cannot be done.

We are entrusted with a very large amount of property. Now, to have persons going about the country "buzzing" these directors who know nothing about it, they say at once, "You are an unskilled man." I want to t ll you of a case which came under my knowledge. Experiments were being tried in the city where I live. I was asked to go into a gas works and take off some photometrical experiments which I refused to do, but after repeated solicitations, and by permission of the president and engineer I did so. I took off experiments by a Bunsen photometer where I could not get but 13.70 candle power, when the books showed 19 candles. I have no doubt there was some carburetting material used somewhere about the premises. To undertake to palm off upon the president and directors that a man can take out of the coal so large an amount of illuminating power is contrary to all experience, and these facts brought here by Mr. Lamson will show these gentlemen that we do know something about the matter we are in charge of.

Mr. Lamson—I think the great reason for these high statements of yield, simply from Penn, Youghiogheny, or Westmoreland coal comes from the fact of using jet photometers. I would like to know if any of the gentlemen have compared jet photometers with the Bunsen photometer. We have found them very unsatisfactory indeed. We have made comparisons and have not been able to get results which would be satisfactory, with the jet photometer. If any gentleman has made any experiment I should like to know about it.

Mr. Cushing—I have both photometers at my works: run the jet photometer, taking the state of it every hour. It has been in operation, say for the last six months, and it has been found to show from a candle and a half, well, say from a candle and a half to a candle and three quarters lower illuminating power than the Bunsen photometer. That has been the regular working of the two photometers all through my practice for the last six months. The jet is run at the works and the Bunsen is run a mile from the works, at my office.

Mr. M. S. Grenough—My experience is different from that of Mr. Cushing. In our exhauster room, at the works, is a jet photometer, which is taken every half hour, also the illuminating power which corresponds to it. At the office I make a daily test with the Bunsen photometer, and average it through the month. The tests of the jet photometer at the works give a much higher grade of gas than I make with the Bunsen photometer. The candle power at the works is 22 or 23 candles. We don't claim any such quality of gas as that; we know we don't make it.

Mr. Dwight—My experience corresponds with that of Mr. Cushing. I take the photometer in the same way; have a jet at the works and a Bunsen at the office. The Bunsen always shows a better quality of gas than the jet. In answer to a question from Mr. Lamson, I reply that I do not clean the burner very often.

Mr. Lamson—The height of the flame depends on the size of the burner. It will become clogged with the gas. The top is very hard indeed; will stand quite an amount of rubbing. I tried to clean out a tip with a wire but could not make it any larger; our man cleans it out with a straw.

The President—I have in my office both the jet and the Bunsen photometers. Our experience of the illuminating power of the gas, taken every day, has been that the jet varies from one half to three quarters of a candle lower than the Bunsen photometer at the office, taken at the same time. I do not think you can depend on the jet photometer for an accurate and reliable test.

Mr. Allyn—It makes a difference of whose make the jet photometer is. They are not always the same. A gentleman said to me that he had a photometer which did not show high quality enough, so he bought one of another maker.

Several members stated what jet photometers they were using, and their several opinions of their respective merits.

Col. Armington—I am a little surprised at our friends Cushing and Dwight's experience in this matter. It goes to corroborate a report made by an editor, who said that in examining some foul lime, that the further you get away from the works the more the smell is intensified. That is not my experience.

There being no further discussion on this subject, Col. Armington moved a vote of thanks to Mr. Lam

son, for his remarks concerning the experiments he had made, and the table of figures presented by him, which was passed.

The President—We have a paper here from Dr. Kidder, which has been before the directors, who found it very interesting, and one which seemed to us proper to be read at this meeting, if the Association wish to hear it. The subject is "Coal Gas."

Mr. Lamson—Dr. Kidder was at my office within a week. He is a very sensible gentleman in his talk on gas matters. As I understand it, this paper is merely a theoretical view which he takes of the distillation of coal, and he treats it very thoroughly. I think it will be a very interesting paper to be read before the Association.

The President—I can only say that *he has nothing to sell.* It is a paper we should all be willling to hear if we have the time to spare.

Col. Armington—We have a by-law that all such papers must be submitted to the Board. I think that has been the case. I have no objection to have the paper read, but I don't want any loophole for just such things as we had a year ago or more, that only take up our time, and do not interest us at all.

The Secretary—The directors approved the reading of the paper, by vote.

Col. Armington—Then I move that it be read. Carried.

Dr. Kidder's paper was then read by the secretary. (See Am. Gas-Light Jour., March 2, 1876).

Mr. Lamson—I should like to know if there is any gentleman present who knows anything about any table or any experiments made upon the question of oil produced from coals. The Doctor states that there is 560 to 600 pounds of oil in a ton of Penn coal. Mr. Massey knows of no experiments that have been made on Penn coal. I think this theory is worth something. If any gentleman has ever come across any table, in regard to the amount of oil produced from a ton of Penn coal, I shold like to know about it.

Mr. Stiness inquired whether Dr. Kidder had an experimental apparatus.

President—I believe he has. I saw one at his office some time ago.

Mr. Stiness—I think Prof. Chandler stated that no such amount of oil was in a ton of coal; and, as far as I am concerned, I never got any such amount of gas from a ton of coal. Don't believe you can get five feet to the pound of 18 candle gas, as far as my limited knowledge goes. I take exception to some of his figures. I don't know but it may be so, but don't believe there is that amount in the coal.

Col. Armington—I don't think Dr. Kidder is the only man in the United States who has taken 20,000 feet of gas out of a ton of coal, in theory, but most of us have not been able to do that in practice.

President—Are there any further remarks to be made on this paper, or what shall we do with it?

Mr. Greenough moved that the paper be returned to Dr. Kidder with thanks.

Mr. Stiness—I second the motion.

Mr. Cushing—I don't think that a motion is at all necessary, If the paper was read by a member of the Association, perhaps it might seem to be the property of the Association; but it comes from an outside party, and has been read by the courtesy of the Association, and belongs to the party who is the author of it.

I hope the motion of Mr. Greenough will not prevail, except so far as the thanks of the Association be given to Dr. Kidder. I move to amend the motion by striking out such words as refer to the returning of the papers.

Mr. Greenough does not accept the amendment.

Mr. Cushing—My amendment is this—that instead of the motion of Mr. Greenough, that the thanks of the Association be given to Dr. Kidder for his paper.

Mr. Greenough—I understand this paper was submitted to the board of directors, according to the constitution.

"Yes," by several voices.

Col. Armington—It does not become the property of the Association. The bye-laws state that a paper shall remain the property of the party who reads it.

Mr. Cushing—It is only a matter of courtesy. I do not think it would be courteous to the author to return it. I move that the thanks of the Association be given to Dr. Kidder, for allowing his paper on "coal gas," to be read to the Association. The motion was carried.

Secretary—It is necessary to determine at some time during this session where the next semi-annual meeting shall be held, if it is proposed to hold one this summer. During the month of August, when we usually meet as an Association, the weather is very warm, and you all know how much we have suffered from the oppressive heat and moisture of the atmosphere on these occasions. Various places for our semi-annual meeting this year have been suggested, but objections more or less weighty have been urged against them all.

I move that a committee be appointed to consider the question, and report a place for holding the next semi-annual meeting.

Mr. Stiness—I hope the matter will be left in the hands of the board of directors. Is it deemed advisable to have a meeting this summer, when so many of the gas fraternity will be in Philadelphia attending the centennial exhibition?

I move that the whole subject be referred to the Directors, with full power.

Mr. Neal's motion being withdrawn, Mr. Stiness's motion passed.

President—Perhaps, gentlemen, it may be as well to decide about visiting the Boston Gas Works.

Mr. Stiness—Mr. Cushing has an article, published by Mr. Bartol, President of the Washington company, and hopes he will read it.

Mr. Greenough said he would like to know at what time the members would visit the Boston Gas Works.

On motion, it was voted to visit the gas works to-morrow morning at ten o'clock.

The secretary said he would make a motion, to try the sense of the meeting, that when we adjourn we adjourn to meet at seven o'clock this evening.

The President—I suggest that we might retain this room until to-morrow morning. If we do, gentleman could come in here and meet each other, and have pleasant interviews after dinner or in the evening, without having a formal meeting.

Col. Armington—I hope the room will be kept for the use of the Association.

Mr. Slater said that if we had no session in the evening, as Mr. Greenough had kindly offered the Association the use of rooms at the gas works, where we can hold a short session, he would move that the vote to meet at 10 o'clock to-morrow morning be reconsidered, and then to fix the time of meeting at the gas works at 9 o'clock, which was duly passed.

Mr. Cushing then read extracts from a pamphlet published by Mr. Bartol, President of the Washington Gas Company, being a communication to the committee on public buildings, of the U. S. Senate, on the petition of the "Oxygen Gas Company of the District of Columbia" for incorporation, showing that the so-called oxygen gas is a costly and very dangerous agent for illumination, and also reviewing the opposition gas schemes generally.

Mr. Dwight announced that dinner would be ready in five minutes.

Mr. Stiness moved to adjourn.

The President—This room will be at the service of the Association, and the members can meet each other here during the evening.

The meeting then adjourned to meet at the Boston gas works, to-morrow, at 9 o'clock in the morning.

At half past four o'clock in the afternoon, the members of the Association, with their friends, sat down to an excellent dinner expressly prepared for them, in one of the small dining halls of the Tremont House.

The president occupied the seat of honor at the head of the table, and having made a few happy remarks, pertinent to the occasion, requested those present to attend to the duty of the hour, which they did with a will. During the progress of the dinner, Capt. Dresser, the accomplished and popular editor of the American Gas-Light Journal, entered the hall, and upon being introduced by the secretary to the company, was most cordially received. In response he made a few remarks, thanking those present for his kind reception, and apologizing for his tardy arrival. After the heavy work of the occasion had been accomplished, speeches, short and felicitous, were made by many of the members and their friends, as they were severally called upon. Thus, in feasting, speech-making, and in social intercourse, two hours or more passed very pleasantly away. The company then left the hall, most of them to return to the room where the meeting of the Association had been held, and where a pleasant and profitable evening was spent in conversation, and free interchange of ideas, suggested by the subjects considered and discussed during the day; while others visited their friends or places of amusement in the city and vicinity.

February 17.

The meeting was called to order by the president, on Thursday morning, in the superintendent's office of the works of the Boston Gas-Light Company, at 9 o'clock, A. M. The roll was called by the secretary and 32 members responded to their names.

Mr. Greenough, in a few words, welcomed most cordially the members of the Association, and said that it would always afford the officers of the Boston Gas-Light Co. the greatest pleasure to impart to any member any information regarding either their experiments or their practical workings. He invited them to go through the works, and if they saw anything that was deemed worth adopting, he hoped they would unhesitatingly do so; and on the other hand, he would be glad to receive any suggestions that might be made by them.

The reading of the record was dispensed with.

The Association then took a recess, in order to afford the members an opportunity to pass through the works, and witness in detail the operations carried on in each department.

An hour or more was spent in this way, in a very agreeable and profitable manner; and those who were so fortunate as to be present, were greatly indebted to M. S. Greenough, Esq., the assistant manager of the company, and Mr. Lamson, the superintendent of the works, who were assiduous in their endeavors to make the visit a satisfactory one, being prompt to direct attention to whatever they might consider worthy of special notice, making explanations, and answering the numerous questions put to them, courteously and explicitly, and generally doing their best to make their guests fully informed with regard to the various processes, chemical, philosophical and mechanical, in operation in the large establishment under their charge. The works were in excellent condition, and indicated faithful and competent supervision.

The last place visited was the apartment containing the new experimental apparatus of the company, which for compactness, simplicity, and effectiveness, may challenge comparison with any other of the kind in this country.

The very interesting and successful experiments made thus far with this apparatus, have, in their beneficial results affecting both this company and the gas interest at large, more than compensated for the outlay incurred, and for the time necessarily expended in making these experiments in a thorough and careful manner.

The Association then returned to the superintendant's office, when the president having called the meeting to order,

Mr. Cushing said—Mr. President: I have a matter that I wish to bring before this Association, and it is of universal interest—the "Metric System of Weights and Measures." I believe it has been adopted by a majority of the nations of the world. It is now permissable in the United States, but not obligatory,

The various scientific associations of the United States are now uniting in a memorial to Congress to make it obligatory after a certain time. I would propose that we pass a resolution at this meeting, authorizing the officers of this association to sign the following memorial (see AMERICAN GAS-LIGHT JOURNAL, page 140) and have it presented to Congress.

The resolution was passed unanimously.

Mr. Harbison—Mr. President: Before we adjourn I would move that the thanks of the Association be tendered the officers of the Boston Gas Co., for the courtesies received at their hands to-day, which was carried.

The President—The matter of the semi-annual meeting was left with the directors.

Mr. Dwight—I had thought we had better not have any semi-annual meeting this year, and I hope the directors will decide not to have one; but if you do have one I shall be with you.

The President—I can say for one that I have had a very pleasant time, and hope every member of the Association can say the same.

The Secretary—Capt. Dresser is here. Perhaps he will favor us with a few remarks before we separate.

Capt. Dresser—Mr. President and Gentlemen: Allow me to return my most sincere thanks for the great kindness and attention that you have shown me; first in the invitation to meet you here, and then in the marked courtesy and consideration shown by all, while I have been with you. It is certainly very gratifying to me, and I trust I may ever be able to show you my appreciation of your kindness. In the great interest which is entrusted to your care there is much to be done. We are, I believe, upon the threshold of improvements which must make great changes in gas making. If anything that I may do can in the least assist you in making better and cheaper gas, I shall be fully repaid for all the attention and study that I am able to give the subject.

The meeting then adjourned.

GEORGE B. NEAL, Sec.

New England Association of Gas Engineers.

Metric System of Weights and Measures.

The following memorial speaks for itself, and we hope it may be followed by many others:

To the Hon. the Senate and the House of Representatives of the United States, in Congress assembled:

The memorial of the Boston Society of Civil Engineers respectfully showeth:

That the weights and measures now generally used in this country do not have simple relations to one another, are ambiguously named, and are inconvenient in computation; and that it is expected that they will be gradually abandoned, and that the only legal standards will be those of the metric system, which has been adopted by most foreign nations, has decimal subdivision like the federal coinage, and possesses other advantages.

That, in anticipation of this result, it was enacted by the Congress of the United States, in 1866, that the metric weights and measures *might* be used in all business transactions.

That, nevertheless, the members of the above-named society and others find it impracticable to avail themselves of the benefits of this permissive legislation by actual changes in the conduct of their business, for the reason that each and every class or profession is in such close relations with other classes in the community, that in this far-reaching reform it is impossible for any one of them to act independently of the rest, or to foretell when others will be ready to co-operate.

That they would welcome legislation which should result in a harmonious movement among all the people, every one knowing when to take the successive steps of change, and confidently relying upon the action of others at a time to combine economically with his own efforts.

The prayer of your memorialist, therefore, is, that your honorable body may enact that, after some date, to be fixed several years in advance, the metric standards in the office of Weights and Measures at Washington, shall be the sole authorized public standards of weights and measures.

And your memorialist, as in duty bound, will ever pray, etc.

We have a needless multiplicity of units, often ambiguously named, and without simple relations to one another. If we had only to criticise the present state of things, we could hardly condemn it too strongly. A single illustration will present the case more clearly. Besides the old beer quart, we have now the U. S. liquid quart, and the U. S. dry quart, all differing materially from each other and from the British Imperial quart. Not one of the four contains any integral number of cubic feet or inches, and only the British holds a weight of water than can be briefly stated.

In view of the amazing increase of international communication during the last half century, it is evident that in making any reform in weights and measures steps should be taken toward uniformity with foreign countries. There does not appear to be any movement among other nations towards the adoption of our yard, pound, and gallon; nor among the English-speaking people themselves are we aware of any active efforts to make them more convenient. The European nations, however, with the exception of England, Norway, Sweden, Russia, and Turkey, may fairly be said to have united upon the metric system, which has also been adopted by our neighbors in Mexico and South America. It has for some years been legalized in the United States and in Great Britain, and the latter has adopted the meter gauge in the construction of some of the India State railways. Even Turkey has made its archive equal 75 centimeters. An international convention, in which more than twenty nations were represented, has prepared standard meter bars, and distributed them among the several countries taking part. The greatest precautions were used to insure accuracy and a permanent bureau has been established to make any comparisons that may be needed in the future for maintaining uniformity. If we appreciate the advantages, therefore, of having one system throughout the civilized world, our first work is to adopt the metric, even if we do not believe that that is the best which will ever be devised. If we should refuse to join in what has already received the approval of the majority of nations, we should not be in favorable position, a generation or more hence, for urging the rest of the world to aid us in any further improvement.

The decimal subdivision of the meter is sometimes objected to as not being so simple as binary division would be; although it appears to us that halves and quarters of the meter might be used as freely as halves and quarters of a dollar are. In fact, its decimal character is one of the very greatest recommendations of the metric system (at least so long as decimal notation prevails in arithmetic, and this can hardly be changed for a century to come). That decimal division of weights, measures, and money is of the first importance in computation is shown by the praise generally bestowed on the federal currency. It is on account of this advantage that engineers use decimals of a foot where they can; although, in doing so, they are at variance with the practice of the rest of the community.

The opinion is also expressed that the meter is not a convenient length for a standard. For some uses it may not be; for others it evidently is. No one standard could be expected to be perfectly adapted to all purposes. We must have several units, appropriate to different classes of measurement; and it is the merit of the metric system that its secondary units have the simplest of relations to one another. In the laboratory the millimeter may be the unit, in the machine shop the centimeter, and on a railroad line the meter and kilometer; but we can translate quantities from one to another by moving the decimal point; whereas quite a mathematical computation is required to reduce inches to feet, rods, and miles.

The real difficulty, we believe, is not with the proposed system, but with making the change. The cost of such a revolution, affecting so large a proportion of the transactions of life, will obviously be enormous; but it is equally true, if not quite so obvious, that it is costing us enormously to keep up the present confusion. The army of custom-house clerks employed in making transfers from one kind of weight to another bears witness to one item of expense. The time thrown away in our schools in teaching innocent children that 7 92-100ñ inches make a link, a fact that surveyors have all but forgotten, is sad to think of, and to pay for. Nearly every individual in his daily business has to undertake brain labor in dealing with our present irregular weights and measures which could be saved by the use of a simpler system. It would be difficult to estimate in money the value of this work; but for our whole population it would amount in a long series of years to an immense sum; to say nothing of the vexation and the probability of being cheated.

Light as a Symbol.

BY BISHOP CLARK, OF RHODE ISLAND.

Last week I had something to say of our improved modes of lighting, and that suggested the thought of the various uses made of artificial light, for other purposes than those of utility.

In all ages, the burning of lamps and candles and perfumes has been one of the most prominent symbols of devotion. The Parsee believed that Zoroaster, the founder of the sect, literally brought the sacred fire down from heaven, which they were careful to keep perpetually burning, and thought would never be allowed to go out, to the end of the world. Such was their reverence for the element of light, that they would never defile the flame of an ordinary lamp by blowing it out with their breath. In the tabernacle erected by Moses, what was called "The holy candle stick," stood before the table of shew-bread, and was lighted every evening. In Solomon's temple, there were ten of these candlesticks, made of pure beaten gold, the lamps of each being supplied with cotton and about two wine-glasses of pure olive-oil, which was enough to keep them burning through the entire night.

The Hebrews were accustomed to keep a lamp suspended from the ceiling of their dwelling-houses burning all night, as is still practiced in some parts of the East, and if by any accident the light happened to go out, it was supposed to indicate the approach of some dire calamity. This may explain the meaning of such passages as these in the Scripture: "The lamp of the wicked shall be put out;" and again when the careful housekeeper is commended by saying: "Her candle goeth not out by night." The burning of a multitude of candles is a prominent feature in Mohammedan mosques, and these must always be of a fixed size and weight, as the length of the service is determined by the time of their continuing to burn. Some of our American manufactures have recently recieved large orders from Turkey for these sacred candles, and been obliged to make new sets of moulds in order to furnish the right sort of article.

The use of tapers in public processions, and the burning of lamps and candles before the sacred shrines and on the high altar, has long been practiced in the Latin and Greek churches; and in St. Peter's at Rome, as also in many other places, the holy light burns perpetually, by day and by night. In the gorgeous symbolism of the Apocalypse, used by St. John to depict the glories of the upper world, we are told that a throne was set in heaven, "And there were seven lamps of fire burning before the throne, which are the seven spirits of God."

Artificial illumination is also the symbol of joy and triumph. If a victory has deen won, or any other important event is to be celebrated, we fill the windows with lights, bonfires blaze in the streets—crim

son stars, flowers of silver, jets of gold, showers of amber rain, are all combined in the most elaborate and artistic fashion—while streaming rockets for the moment extinguish the milder light of the far-off suns and planets.

I happened once to be in the Chamounix on the occasion of a grand fete. There were abundant fireworks during the evening, but these were all eclipsed when, at a later hour, brilliant lights flashed out on every side away up among the mountains, and we saw *the Alps illuminated*. To-day, the man in whose honor the mountains were thus made to shoot forth fire, lies sleeping in a humble English grave, and France has an emperor no longer.

I wish that it were possible for me to give a true idea of the Falls of Giessbach, on Lake Brienz in Switzerland, as they appear at night when they are lighted up by artificial fires. Imagine a cascade falling from a height of about a thousand feet, broken at intervals by projecting rocks, crossed by one or two rustic bridges, and somewhat obscured here and there by the branches of over-hanging trees. It is a pleasing object to look upon by day-light, but at night it is transformed into something magical. At the given hour, a rocket ascends from the top of the mountain, which is at once responded to by another below, indicating that everything is ready. Suddenly, the stream that was hardly visible before, gleams forth like a sheet of molten silver, the leaves of the trees in some places breaking the smooth surface into a sort of silver fret-work and every line of the little bridges as distinct as if they were ruled on paper. It seems as if nothing could be more entrancing, when, all at once, the white surface brightens into molten gold; after a while it deepens into crimson, as if it were a torrent of blood that flowed from the heavens, then it softens into green and blue and violet, until at last the waters glisten at the same moment with every color of the rainbow. Finally, there rises from the caldron into which this river of fire is emptied, a cloud of spray and smoke, enveloping the stream like a veil, behind which the light dies away into the darkness.

Light is also the symbol of protection. What is there more solemn and impressive than the beacon-light that shines over the sea, in calm weather welcoming the weary mariner to his home, and warning him of danger amid the thunderings of the storm. Where the pitchy flame from the cresset once rose and fell with the wind, throwing its lurid and uncertain light across the broken waves, we now have a strong and steady light, multiplied by innumerable reflectors, which no breeze can disturb and no storm can extinguish. In this case, the symbol is also the means of protection. But what a strange thing it must be to live in one of those tapering structures of iron or stone, that stand clamped to a solitary rock in the open sea, to warn the mariner away from the perilous reefs that lie around. How do the light-keepers feel, as they sit there all alone week after week, and month after month, where they can hear nothing but the wail of the winds and the groanings of the waves and the shriek of the sea-bird, and see nothing but the sky and the clouds and the waters. How do they feel, in the bleak winter-night, when the mad waves dash against the uppermost windows, and the tall shaft sways to and fro in the gale, and they know that there is but a step between them and death! I wish that some of these men would send us a letter or two from the light-house, and tell us how they live and how they feel. It is a marvel that one should be willing to spend his days in such a dreary and perilous solitude, but somebody is ready to do what ever needs to be done in this world. People have wonderful facility in adapting themselves to circumstances, and find relief from the monotony of existence in very strange resources.

Light is also the symbol of peace and domestic tranquility. The lamp, gleaming from the open door, or shining through the cottage casement, awakens peculiar associations and suggests many pleasant thoughts. A house buried in darkness is a gloomy thing to look upon. It is an old Philadelphia custom, when there is a death in the family, "to bow the windows," as they term it—that is, to close for a certain time the heavy wooden shutters on the outside of the house. They show their grief, by putting the mansion into mourning. But, in ordinary times, for the sake of the passer-by, we ought not to draw the shades too close about the windows. If one, who returns after an absence from home, fails to see the light burning in the accustomed place, he is filled with forbodings. The old superstition of the Hebrew had its meaning. It was in obedience to a deep instinct of our nature that the good mother was led to keep the lighted lamp at the window for her poor boy at sea, so long after the waves had sung his dirge.

We read of a world where there is no need of the sun, or the moon, or the stars. The atmosphere is self-luminous. Sometimes a ray of that celestial light finds an entrance into the soul this side the grave. It is the symbol of purity and holiness—and "a lamp unto our feet," that will keep us from going very far astray.

Correspondence

[Correspondents, in all cases, should sign their communications with their names and address in full—not for publication, unless desired, but as a guarantee of good faith.—ED.

Very Gassy.

NEW YORK, March 18, 1876.

Mr. Editor: In your last number Mr. Dwight says: "The managers of the Lowe process have, of late, been charged by gas men with *undue modesty*." I do not think such a charge could have emanated from any gas man who had been the recipient of the *circulars* respecting that process, which I received some time ago. I, certainly, could not discover any modesty—first, in taking to itself the name of the National Gas Company, and thereby so nearly simulating that of the National *Coal* Gas Company, as to make it seem to the public to be identical with it; nor, second, in its *oriental style* of stating the merits of the Lowe process, so as to make one unconsciously gaze upward, expecting to see a *ballon* soaring in its aerial flight.

But, certainly, those managers can no longer be charged with undue modesty, since Mr. Dwight, with more than a poet's privilege, asserts "that, by no process to this present time known, and demonstrated on a large working scale, has an illuminating gas of so fine a quality been produced, at anything like so low a cost, as by the Lowe process."

I take issue with Mr. Dwight upon his claims.

1. The cupola, for making illuminating gas, was the invention of William H. Gwynne, and was patented by him December 15, 1863. But, although owned by the National Coal Gas Company, it is, in principle, practical results, and safety, so inferior to the apparatus used in the Gwynne-Harris process, that we have deemed it comparatively worthless.

2. To every thoughtful, inquiring mind, it must be apparent that where, as with the cupola, the coal within it must be raised to incandescence from an exterior strong current of air, causing an enormous combustion, and requiring changes every few minutes from making gas to blowing up the fires, to say nothing of the danger of blowing up the whole concern, the result cannot, in the nature of things, be as good and economical as under the Gwynn-Harris process, where the gas is made continuously, and no air is introduced; not a change occurs, except that once in twenty-four hours the lid is opened, the coal raked back, a few shovels full of anthracite are thrown into the front of the retort, and the lid closed again for the day; once in each week the refuse is drawn, and the retort newly charged.

3. I believe that I hazard nothing in stating the cost of introducing the cupola process, into any existing gas works, to be many times greater than that of the Gwynne-Harris process. We use the same arches and our retorts are set similarly to those for ordinary coal gas, at an extra cost of not over $150 per bench; and if oil becomes less economical than rich coals for illuminants, our process is equally adapted to the use of either material; while the cupola system requires a new building and cumbersome apparatus, and, if for any reason it does not prove satisfactory, it becomes utterly useless—much more so than Mr. Barnum's elephant with which he tried a new experiment in farming, for when he failed in that, the elephant was worth something for a show.

I hope that the idea of *undue modesty*, in asserting its claims to superior excellence, will no longer cause sleepless nights to "the managers of the Lowe process."

H. P. ALLEN.

SEDALIA GAS-LIGHT CO.,
SEDALIA, MO., March 20, 1877.

Mr. Editor: Noticing from time to time the articles in your paper, in the matter of gas from crude petroleum and naphtha, I desire to say that such articles have the tendency to greatly injure the interests of gas companies throughout the United States.

The idea is scattered broadcast, that gas from crude petroleum, naphtha, etc., can be obtained at a cost ranging from thirty-five cents per thousand to sixty-five cents, and they base their statement on so many gallons of oil, labor and fuel, and in one or two statements they give wear and tare, the sum total to yield being thirty-five to sixty-five cents; and because this can be done, the people, consumers of gas throughout the country think gas companies are outrageous extortionists. Why cannot a true business statement be made out?

Any concern can take a barrel of naphtha of high gravity, containing, say forty-five actual gallons, and distil it by, say Lowe's process, and take the product and say

Forty-five gallons cost.....
Time of labor.....
Quantity of fuel.....

and may add a per centum for wear and tare, and say —thousand feet yield cost so much, and blow the bugle for the grand result.

If all the gas works in the States were located in the oil regions, where oil and coal, with labor, is to be had at the lowest possible cost, then these statements might be taken for facts.

The case being entirely different, the only statement exhibited to the gas world worthy of consideration, should be made up from actual facts after time, locality, and everything pertaining to the operation of gas works, have been duly taken care of.

My statement would embrace as follows: Gallons of oil; bushels of coal; labor of men; wear and tare. Then—leakage of oil; office expense; extension of mains; repairs of mains and services; repairs of meters, etc.; taxes, etc.; salaries of officers; interest of investment, and patent rights (a big item).

Take this sum total and divide out by the yield of oil, and give the cost to the people, and I think few companies remote from Pennsylvania want any oil in theirs.

I never can understand the gain of burning gas to make gas. I say there is no comparison, when you take a large works making gas from coal, and can dispose of surplus coke, all the tar, ammonia, and spent lime, and no patent to pay for. Why, to make use of any of the patent processes now spoken of in our small western works, would take every cent of profit on sales of gas.

To use oil or naphtha, the price in Pennsylvania is one to ten, one thousand miles away, the time of delivery is as one to blank; leakage by even tank cars, to say nothing about barrels and their cost is no small item; and last, to use a good coal which has four feet of good gas in each pound as fuel, or partly as fuel, losing all its product except heat, is the height of bad business.

My experience teaches me that to simplify the manufacture of gas from coal, so as to obtain the greatest yield and the best quality of gas, by doing away with much complicated machinery to reduce

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THIS IS A RECOGNIZED OFFICIAL ORGAN OF—
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MONDAY, APRIL 3, 1876.

back pressure, and use less water in washing, with as few high salaried men as possible is what is wanted. With conomy and care in every department, so as to avoid the many wastes and leaks, and I will vouch that as good an article of illuminating gas can be made from coal as the people want, and cheap enough.

Very respectfully, yours etc.,
JOHN F. ANTES.

N.B.—Why are not the English up to all these fool notions?

OFFICE FLINT GAS-LIGHT CO.,
FLINT, MICH., February 12, 1876.

Mr. Editor: We have a six inch iron main which descends at about 45° a distance of twenty-six feet, then crosses the river one hundred and thirty feet, then ascending at same angle twenty-six feet, then to the consumer.

The above pipe (horizontal) is laid on the river bottom, and the two twenty six feet conducting pipes are in the bridge piers. The horizontal are constantly under water, and the two twenty-six feet pipes are in from six to twenty feet.

The illuminating power of the gas, after crossing the river or passing through the above pipe, is very poor, averaging from ¾ to ⅞ poorer than the gas before passing through the above pipe.

Will you please give your opinion as to the cause of this difference, or loss of light, by passing through this pipe, through your correspondence columns, for the benefit of some of the directors. Truly yours,

F. P. HAMILTON,
Sup't City of Flint Gas-Light Co.

Reply to Subscriber.

Mr. Editor; In reply to "Subscriber" in your issue of the 16th March, I would suggest a careful perusal of the paper on "Coal Gas," read before the New England Gas-Light Association, at their late meeting in Boston, and published in your Journal on the 2nd March, believing that he may then find the best use which can be made of tar by avoiding its production. Yours respectfully,

ANOTHER SUBSCRIBER.

Gas Tar.

NEW YORK, March 28, 1876.
117 BROADWAY.

Mr. Editor; "Subscriber," writing from Johnstown, N. Y., in your last issue, asks "if there is any way of using up the gas tar to advantage, made by a small works, etc." Permit me to answer him by saying that the East Chester Gas Co., at Mount Vernon, N. Y., have, for the last three years, burned all the tar made, under the retort, in place of coke; the estimated value of a gallon of tar for that purpose being one-half to five-eighths of a bushel of coke.

Respectfully yours,
CHARLES NETTLETON,
President East Chester Gas Co.

Chemical and Scientific Repertory.

WATERPROOFING UMBRELLAS.—Fischer.—Dissolve 1 part paraffine in 10 to 15 parts benzol.

PFLUG'S SO-CALLED PLATINUM PAINT.—Heyl.—This paint, when mixed with linseed oil, is preferred to red lead, oxide of iron, silica, and graphite paints for exposed iron work, as it adheres to the rusted surfaces, and can scarcely be scratched off with a knife. The cost per square meter was 8¼ kreutzers, or for two coats 12 kreutzers.

NEW SPECTROSCOPIC METHOD FOR DISCOVERING IN GASEOUS MIXTURES AND LIQUIDS THE SMALLEST QUANTITY OF A GASEOUS OR VERY VOLATILE HYDROCARBON.—A. and G. De Negri.—Into a Geissler tube is introduced a small quantity of a gaseous mixture, which ought not to contain oxygen, carbonic oxide, or carbonic acid, exposing it to a barometric pressure not greater than 20 m.m. If in the gas under examination a hydrocarbon is present, on causing it to be traversed by a spark from a Rhumkorff's coil, a sky-blue light suddenly appears, which, if viewed with the spectroscope, presents the spectrum of carbon, and generally so brilliant as to mask totally the spectra of other gases present, not excepting nitrogen.—*Gazetta Chemica Italiana.*

CURRENT NEWS.—Russia has forbidden the importation of all aniline colors, crystallized fuchsin alone excepted. The importation of artificial alizarine is also prescribed, apparently because the Russians wish to protect the cultivators of the madder plant.—*Reimann's Farberzeitung.*

INSOLUBLE CEMENT FOR GLASS is obtained, according to Prof. H. Schwarz, by dissolving one part of bichromate of potassium for every 5 parts of gelatin, or glue, in a solution containing from 5 to 10 per cent. of the latter. After having been applied to the glass, the cement, on exposure to the sunlight, loses its property of swelling and dissolving in water, in consequence of the partial reduction of chromic acid.—*Am. Jour. Pharm.*

A GOOD COPYING INK from extract of logwood is obtained by treating 250 grams of coarsely powdered American extract of logwood, in a suitable bottle, with 3 kilos. distilled wate. When this is completely saturated with the soluble coloring matters, say in about one or two weeks, the clear solution is carefully decanted from the sediment, about 20 grams acetate of iron carefully dropped in, until a deep violet-blue color is obtained. It is advisable to set the mixture aside for a few days to ascertain the change of color produced. The ink must be protected from the influence of the sunlight, and instead of gum arabic, solution of dextrin or sugar is preferably added to it.—*Ibid.*

SOLUBILITY OF NAPHTHALEN IN WATER.—Naphthalen is generally stated—I think on the authority of Garden—to be insoluble in cold water, and but slightly soluble at the boiling point. It is found, however, that naphthalen, like camphor, moves spontaneously when placed upon the surface of water. According to the theory of Platteau these movements are due to the high surface-tension of a solution of the moving solid. Hence this theory must be laid aside if Garden's statement be absolutely correct.

Naphthalen, purified by re-sublimation through filter-paper, was boiled for some time with distilled water; the solution was allowed to cool to the temperature of the room, and filtered twice through Swedish filtering-paper. A portion of the solution was evaporated to dryness on the water-bath; no residue was was left, since naphthalen is very volatile in steam, and this may have occasioned Garden's statement. Another portion of the solution was heated in a glass bulb, and the boiling-point taken by a thermometer immersed in the liquid; it was 103°C., a small piece of clean platinum wire occasioned no change. The boiling point of freshly-boiled distilled water was then taken under exactly the same conditions; it was found to be 102·4° C, and after throwing in the clean platinum wire, 102.1° C.

On another occasion the solution was made from ordinary filtered water; the boiling-point, with or without the platinum wire, was found to be 103·2°C., that of the water itself being 101·4°C., or with the platfnum wire, 101·3°C.

From these experiments it seems that sufficient naphthalen remains in solution to alter the boiling-point at least half a degree, and that Garden's statement cannot be taken as being absolutely correct; hence no doubt is thrown on Platteau's theory. It may be remembered that camphor itself is but very slightly soluble in water.—*Chem. News.*

PENETRATING POWER OF DIFFERENT COLORED LIGHTS.—An experiment was lately made at Trieste, to determine how far lights of different colors penetrate darkness. Half a dozen lanterns with carefully selected glass, and all furnished with oil and wicks of the same quality, were lighted on the beach, and then observations were made by a party in a boat. At the distance of half a league, the dark-blue lantern was invisible, and the deep-blue one nearly so; hence it appears that blue lights are not adapted for use in lighthouses, or as signals. Of all the colors the green was visible for the longest distance, with the exception of the red, which ranked next to the white in power of penetration. The conclusion is, that only the green and the red are suitable for signals; and the green light the Trieste observers only recommend for use in conjunction with white and red lights, inasmuch as, when viewed from a short a distance, an isolated green light begins to look like a white one.—*Popular Science Monthly.*

MUCILAGE FOR MINERALOGICAL SPECIMENS.—Mr. F. C. Hill sends to the *American Journal of Pharmacy* a recipe for mucilage to mend fossils and minerals. The cement is described as invaluable, being very adhesive, never becoming brittle or scaling off, and answering well for gumming labels, etc. Starch, two parts; white sugar, eight; gum arabic, sixteen parts; water, sufficient. Dissolve the gum, add the sugar and starch, and boil until the starch becomes transparent.

Gas-Light Intelligence.

United States.

We regret to anonuce the death at Paris, on Wednesday February 23rd, of Mrs. Isabelle Constance Barlow, widow of the late proprietor and editor of the *London Journal of Gas-Lighting.*

During the past week contracts were made by the Manhattan Gas-Light Co. of this city, with the Architectural Iron Works of New York, for four scrubbers, two at 14th street and two at 18th street stations. They are to be built of iron, and will be 85 feet high and 18 feet in diameter.

The same company also contracted with Morris, Tasker & Co, Limited, of Philadelphia, for two multitubular condensers for the 14th street station. The whole to be completed during the coming summer.

While Jacob Breman was making gas in Pottsville, Penn., on Saturday evening of last week, a barrel of gasoline caught fire and burned him so badly that his recovery was considered doubtful.—*N. Y. Ledger*

Morris, Tasker & Co., Limited, have contracted with the Washington Gas-Light Co. to build one telescopic holder 128 feet in diameter, 28½ feet lift, with

12 cast iron columns 65 feet high, and wrought iron lattice girders; four purifiers 25 feet by 25 feet by 4½ feet, with lifting apparatus for each; two scrubbers 45 feet high and 12 feet in diameter; five iron trussed roofs of about 68 feet span; also the 20-inch connections necessary for the new scrubbers and purifiers.

The same firm are putting in the iron work for new purifying house at Newark, N. J., and are furnishing seventy Morton lids to New Orleans.

HEAVY CITY VERDICT.—Very quick work was made of an important suit brought to trial last week, before Judge Barret, holding Supreme Court, Circuit. The case was the suit brought by the Metropolitan Gas-Light Company vs. The City, to recover $133,264 23 for gas furnished in 1874. The case was defended on the ground that the plaintiff omitted certain necessary signtaures to the contract papers. Judge Barrett thought it was a most outrageous defence, and directed a verdict for the plaintiff for the full amount claimed.—*N. Y. Herald.*

THE PROPOSED PEOPLE'S GAS COMPANY IN CINCINNATI—ACTION BY THE BOARD OF ALDERMEN.—At the meeting of the Board of Aldermen, yesterday afternoon, Mr. Voigt presented the following:

Your Special Committee, appointed to confer with a similar committee appointed by the Board of Councilmen to inquire into the standing and responsibility of those now asking for the right to lay gas mains in our streets, &c, beg leave to make the following report:

That after conferring with the parties asking this privilege, upon two separate occasions, and after affording them the fullest possible opportunity, they were entirely unable to produce any evidence of sufficient responsibility to carry out in good faith such an undertaking, and that the privilege asked for should not, therefore, be granted.

We have also conferred with the Cincinnati Gas-Light and Coke Company, and after several conferences, have agreed upon the terms as expressed and set forth in the communication from the Company herewith presented, and respectfully recommend the acceptance of the same.

LEWIS VOIGT,
J. M. BRUNSWICK,
JAMES SAFFIN.

OFFICE CIN. GAS-LIGHT AND COKE CO,,
CINCINNATI, MARCH 23, 1876.

Lewis Voigt, Chairman Committee Board of Alderman, City of Cincinnati:

Sir—Having been duly authorized by the Board of Directors of the Cincinnati Gas-Light and Coke Company to conduct, within certain limits, negotiations, with your committee, with a view to agreeing upon concessions in the price now charged for gas under present contract, and these negotiations having resulted in an agreement upon the following basis:

1. A reduction of price to two dollars ($2) per thousand cubic feet, with five per cent. discount, making the price one dollar and ninety cents ($1.90) to the consumer.

2. The Company to furnish, free of expense, all service pipes between the main pipe and line of consumers' premises, not exceeding fifteen feet from curb line.

3. An extension of the present contract for a period of six years, or term of ten years from date of reduction.

4. Nothing in the agreement on subsequent contract to be understood as a waiver of any legal rights or privileges now enjoyed by the Cincinnati Gas-Light and Coke Company.

I have the honor to inform you that said agreement has this day been approved by the Board of Directors of this Company. Respectfully,

A. HICKENLOOPER. VICE-PRESIDENT.

The report was adopted by a vote of 13 to 6.—*Cincinnati Times.*

Great Britain.

FATAL GAS EXPLOSION AT GLASGOW.—On Saturday, February 26, a gas explosion of an alarming nature, and accompanied with fatal results, occurred in the east end of Glasgow. In consequence of alterations which had been made in Market street, a number of men in the employment of the Gas Corporation were during the day engaged renewing the branches and repairing the connexions of the gas pipes Whether from the extra pressure on the main or not, a crack had apparently been made in the pipe which was laid under the house No. 45 Market street, the ground floor of which is occupied by a shoemaker named William Turnbull. About one o'clock Turnbull, who worked in one of the rooms, smelt an unusually strong smell of gas, and some of the workmen outside having been called in, they came to the conclusion, after an examination, that gas was escaping from some of the pipes leading to the dwelling. One of the flagstones of the pavement was lifted, and one of the men drew a light along it, and instantly an explosion occurred. Not anticipating anything serious, the men had gathered round the hole, and by the force of the explosion they were hurled with considerable force in all directions. The windows of the adjacent house were completely smashed, and on the neighbors, who had rushed out on hearing the report of the explosion, entering Turnbull's apartments, the flooring was discovered to be torn up and shattered, while the unfortunate tenant was found lying in his room in an almost insensible condition. His right leg was severly fractured, the chest injured, and bruises were sustained about other parts of his person. He was removed to the Royal Infirmary, where he lingered in great pain until the following day, when he died Of the other sufferers, Mrs. Turnbull was found to have got her left thigh much injured, while the workmen were more or less cut and bruised, and burned about the face, head, and hands.—*Jour. of Gas-Lighting.*

Ile's Differential Compass.

At the meeting of the Institute in December last a model of the working parts of this instrument was exhibited and explained. This compass is intended to show on shipboard any aberration of the steering needle caused by iron, either as used in the construction of the vessel or carried as cargo, and to enable a mariner to restore true reading by making due compensation.

Its principal difference from the ordinary ship's compass consists in its having two needles suspended in the usual way and placed one above the other at such distances as to preclude undue mutual influences. These needles are constructed of strips of non-magnetic material—preferably alluminum—6 in. long by ¾ in. wide. On the upper one are fastened a large number of minute steel magnets, about ¾ in. long, placed parallel with the body of the needle and the like poles all in one direction. As each magnet tends North and South, the whole needle will point in that direction.

The lower needle is composed of a strip and magnets of the same materials and dimensions, but the magnets are fastened to the strip crosswise with like poles all in one direction, and as all these magnets tend North and South, this needle will point East and West. The needles are thus constructed in order to distribute the magnetic force evenly through their length and thus cause them to be equally influenced in aberration and compensation.

It is evident that if there be no local attraction, the two needles must stand at right angles to each other, but when such local attraction does exist, it will be detected by the inclination of the needles toward it at an acute angle; the amount of deflection of each needle depending on the position and strength of the local attraction.

Compensation to restore true reading is effected by using the repellant pole of a large bar magnet in either acute angle until 90° is restored. But as the compensator can restore 90° when placed on any line, and as it only gives true results when its direction coincides with the direction of the disturbing cause, the latter is determined by using the bar magnet in connection with a short table to be constructed at the factory and to accompany each compass. When the position of the bar magnet for obtaining true compensation has been determined, it is fixed there until there is a marked change in the ship's heading, when it will need to be determined anew.—*Jour. Franklin Institute.*

Price of Gas.

In reply to our request in the last number of the Journal, we have received quite a number of answers. We hope that all those who have not yet sent us the price at which they sell gas, will not fail to do so at as early a day as possible. It is proposed to continue the list so as to make the record complete.

The following prices are *official*, having been furnished to the AMERICAN GAS-LIGHT JOURNAL by the officers of the various Gas Companies.

Albany (Peoples) N. Y.	$2.75	
Annapolis, Md.	3.40	
Atchison, Kansas.	4.50	
Austin, Texas.	6.00	
Allegheny City, Pa.	1.80	20 p. ct. off prompt pay
Albany, N. Y.	2.75	
Brooklyn, B'klyn.	2.75	
" Citizens.	2.75	
" Nassau.	2.75	
" Metropol'an	2.75	
" Peoples.	2.75	
" W'msburgh	2.75	
Brockton, Mass.	3.80	
Batavia, N. Y.	3.00	
Bridgton, N. J.	3.50	
Bangor, Me.	3.00	
Boonville, Mo.	4.50	
Brownsville, Tenn.	4.50	
Belfast, Maine.	4.00	10 p. c. off bills over $10; 5 p. c. off bills under $10.
Brockville, Ontario.	3.75	
Bloomfield, N. J.	3.75	
Cleveland, Peoples, O	2.00	
Cumberland, Md.	3.00	
Charleston, W. Va.	4.00	25 p. ct. off prompt pay Meter rent 25, 30, and 50 cents. per m. for 3, 5 and 10 light.
Cincinnati, Ohio.	1.90	
Columbia, Mo.	4.50	
Carondolet, South St. Louis, Mo.	3.00	5 p. ct. off prompt pay,
Chattanooga, Tenn.	3.00	
Cold Water, Mich.	3.25	
Chicago, Ill.	2.50	
Columbia, Pa.	2.85	Lowe process.
Charlottesville, Va.	3.50	Meter rent 20 cents.
Derby, Conn.	3.60	10 p. c. off prompt pay, and 50 cts per M. on excess of 5000 ft. per month.
Decatur, Ill.	3.50	50 cts. per M. added, if not paid by 10th.
Dover, Del.	3.60	
East Boston, Mass.	3.00	
East St. Louis, Ill.	3.50	5 p. c. off prompt pay.
Evansville, Ind.	3.00	City lamps $30.
Erie, Pa.	3.00	City lamps $28 p. an.
Elkhart, Ind.	3.50	
East Newark, N. J.	4 00	
Eastchester, N. Y.	3.50	
Fredericksburg, Va.	3.40	
Flint, Mich.	3.50	
Franklin, Pa.	3.00	
Guelph, Ontario.	3,50	
Geneva, N, Y.	2.50	5 p. c. off prompt pay. Wood and oil gas.
Greensboro, N. C.	4.00	
Galena, Ill.	4.50	Meter rent 25 cts. per month.
" "	4.00	After September 1st.
Hagerstown, Md.	3.75	
Hamilton, Ohio.	4.00	
Hillsdale, Mich.	3.50	
Holyoke, Mass.	3.01	
Ithaca, N. Y.	4.00	5 p. c. off prompt pay.
Indiana, Pa.	3.00	10 p. c. off prompt pay. Meter rent 10 cents per month.
Jersey City, N. J.	2.75	
Joliet, Ill.	3.50	
Jacksonville, Ill.	4.00	12½ p.c. off prompt pay.
Jefferson City, New Orleans, La.	4.00	
Knoxville, Tenn.	3.00	Meter rent 15 cents.
Lyons, N. Y.	4.00	
Lima, Ohio.	3.80	
Lynchburgh, Va.	3.00	5 p. ct. added to bills not paid in 5 days.
Louisiana, Mo.	4.50	
La Crosse, Wis.	4.50	50 cents per M. off prompt pay.
Lancaster, Pa.	3.00	
Louisville, Ky.	2.70	5 p. c. off prompt pay.
La Porte, Ind.	3.50	Wood and oil gas,
Lowell, Mass.	2.50	
Millville, N. J.	3.12	
Milford, Del.	3-50	

Marquette, Mich.	3.50	
Morris, Ill.	2.00	For 15 candle power or $10 per M. coal gas meter measure (Petroleum Gas—Wren's patent).
Meriden, Conn.	3.93	
Marietta, Ohio.	3.50	20 cts. per M. off if paid by 6th. Consumers over 3000 ft. 30 cts. additional discount.
New York, New York.	2.50	
" " Harlem....	2.75	
" " Manhattan	2.50	
" " Mutual.....	2.50	
" " Mropolitan	2.50	
" " Municipal.	2.50	Water Gas.
Nashville, Tenn.	2.85	
Newark, Citizens, N.J	3.00	5 p. c. off prompt pay.
Norfolk, Va.	3.10	
New Brunswick, N. J.	2.70	
Newton, N. J.	4.00	
North Attleboro, Mass.	3.50	
New Britain, Conn.	3.70	
New Haven, Conn.	2.75	
Nantucket, Mass.	3.00	Meter rent 15 cts. p. m.
Newark, N. J.	2.85	
Oswego, N. Y.	3.15	5 p. c. off prompt pay.
Ottawa, Ill.	4.00	12½ p. c. off prompt pay
P'keepsie, Citizens	2.70	Gwynne Harris process
Paterson, N. J.	3.80	10 p c. off prompt pay, and in addition 5 p.c. on bills of $200; 10 p. c. on bills of $1000
Portchester, N. Y.	3.50	
Pittsfield, Mass.	3.50	5 p. c. off prompt pay, and 10 p. c. off on bills of $350 per an.
Portland, Me.	3.00	
Paris, Ky.	4.50	Meter rent 25 cts. p m.
Portsmouth, N. H.	3.22	
Pittsburgh, Pa.	1.00	
Quincy, Citizens, Mass.	5.00	
Quincy, Ill.	3.50	
Quebec, Ont.	2.40	
Rome, N. Y.	3.60	
Rochester, N. Y.	3.00	
" Citizens...	3.00	
Rordout, N. Y.	3.60	
Syracuse, N. Y.	2.75	
Springfield, Ill.	3.25	$25 for city lamps.
St. Joseph, Mo.	4.00	12½ p. ct. off on bills over $100 p. month.
St. Albans, Vt.	5.00	10 p. c. off prompt pay, and in addition 5 p. c. off bills from $50 to $100 per month; 10 per. ct. off bills over $100.
Sandusky, Ohio.	3.00	
Saratoga, N. Y.	5.00	20 p. c. off prompt pay, Nov. 1st to May 1st. 10 p. c. rest of year.
San Antonio, Texas.	7.00	5 p. c. off prompt pay.
St. Charles, Mo.	4.50	
Sidney, Ohio	3.25	
Steubenville, Ohio	2.50	
Sherman, Texas.	5.00	5, 10, 15 and 20 p. c. off, according to quantity.
Tiffin, Ohio.	3.00	
Wilkesbarre, Pa.	3 50	10 p. c. off prompt pay.
Worcester, Mass.	3.00	5 p. c. off on $500, and 10 p. c. off on $1000 in six months.
Westfield, N. Y.	4.00	10 p. c. off prompt pay.
Washington, D. C.	2.25	
Watertown, N. Y.	4.50	10 p. c. off prompt pay.
York, Pa.	3.20	
Youngstown, Ohio	2.50	10 p. c. off on bills of $50 per month.
Zanesville, Ohio.	2.70	10 p. c. off on bills of $25 per month; city lamps $23.

Gas Stocks.

Quotations by W. B. Scott & Co., Bankers,

24 Pine Street, New York City.

April 3, 1876.

☞ All communications will receive particular attention

Gas. Co.'s of N. Y. City.

	Capital.	*Par.*	*Bid.*	*Asked*
Harlem	$1,850,000	50	115	120
Manhattan	4,000,000	50	265	270
Metropolitan	2,500,000	100	140	145
" Scrip	$1,000,000	..	101	---
" Bonds..	500,000	1000	104	---
Mutual	5,000,000	100	110	111
" Bonds, gold.	900,000	1000	105	---
New York	4,000,000	100	135	149
Central, Westchester	466,000	50	100	105

Gas Co.'s of Brooklyn.

Brooklyn	2,000,000	25	180	---
Citizens	1,200,000	20	90	100
" Scrip	320,000	1000	99	---
Peoples	1,000,000	10	65	70
" Bonds.	$ 325,000	...	---	95
" Scrip	300,000	...	85	---
Metropolitan	1,000,000	100	---	75
Nassau	1,000,000	25	---	101
" Ctfs.	700,000	1000	96	98
Williamsburgh	1,000,000	50	122	---
" Scrip		...	96	100

Out of Town Gas Companies.

Buffalo Mutual, N. Y	750,000	100	---	80
" Bonds	200,000	1000	---	90
Baltimore, Md.	2,000,000	100	170	...
" Ctfs., gold	1,000,000		100	---
Brockport, N. Y.	25,000	100	...	80
Citizens, Newark.	918,000	50	87½	---
" " Ctfs.	53,000	---	---	---
" " Bds.	124,000	---	---	---
Derby of Conn.	160,000	100	...	80
East Boston, Mass.		25	132	---
Hannibal, Mo.	100,000	100	95	100
Hartford, Conn.	700,000	25	41	---
Hempstead, L	40,000	100	...	---
Jersey City	386,000	20	160	170
Jamaica, L. I.	25,000	100	...	---
Jacksonville, Ill.	120,000	50	82	...
Lewistown, Maine	400,000	100	33	---
Lima, Ohio	60,000	100	85	...
" Bonds	30,000			
Laclede, Mo.	1,200,000	100	---	115
Peoples, Jersey City		...	125	135
Peoples of Albany	650,000	100	31	---
" Bonds	350,000	1000	---	---
Peoples of Baltimore		25	96	...
Rochester, N. Y.		100	50	60
Richmond Co., S. I.	300,000	...	---	---
Fort Wayne, Ind.		100	...	---
Woonsocket, R. I.	150,000	100	100	...
Halifax N. S.	400,000	40	148	150
Hamilton, Ontario	150,000	40	112½	

The following stocks were sold at auction—

Mutual Gas Company, of New York City, have declared a dividend of 2½%, payable April 1st.

Laclede, St. Louis, gas-light company's bonds sold @ 102, flat, interest payable March and September.

We note quotations of several gas companies of London, in the *Journal of Gas-Lighting*, corrected by Mr. F. N. Golding—

Commercial, par £100—bid, 199—asked, 201. Gas Light and Coke Coke Company, par £10—bid, £20—asked, 21. Imperial, par £100—bid, 203—asked, 205. Imperial, Continental, par £43 15 s.—bid, 78—asked, 80. Hong Kong, China (Limited), par £10 8s.—bid, 15—asked, 16.

PRICES OF FOREIGN AND DOMESTIC GAS COALS.

[Reported Expressly for this Journal.]

April 3, 1876.

DELIVERED IN NEW YORK.

English Cannel.

Ince Hall	$17 00	@	18 00
Kirkless Hall	16 50	@	17 00

English Caking Coals.

Newcastle Gas	$5 50	@	00 00
Liverpool caking	11 50	@	12 00

British Province Coals.

Pictou			2 00
Block House—At Mines, $1.87, Gold			2 00
Caledonia—At Mines, $1.50, Gold			0 00
Little Glace Bay—At Mines, $1.75, Gold			0 00
Lingan—At Mines, $1.75, Gold			0 00
Sydney—Old Mine			3 00
" Reserve, $1.75, GoldMine			0 00
" International			---

Duty, 75 cents per ton, gold. Freight to New York $2 00 currency. Cost of above coals delivered in New York, $4 75 @ $5 00, currency.)

Pennsylvania Coals.

Penn Gas Coal—At Amoy	$5 60	@	0 00
Westmoreland—At Amboy	5 60	@	0 00
Shafton	5 60	@	0 00

(In New York, the above coals $6 00)

Youghiogheny	6 00	@	0 00
Waverly	6 00	@	0 00

West Virginia Coals.

MurphyRun	$6 50	@	0 00
Despard	6 50	@	0 00
West Fairmont	6 50	@	0 00
American Gas Coal	7 40	@	0 00
Fairmont	6 50	@	0 00
Newburgh Orrel	6 50	@	0 00
Pinnickinick	6 50	@	0 00
Cloverhill of Virginia	6 00	@	6 50
McKenzie Compound Mixture			---

American Cannel Coals.

Peytona of West Virginia	$12 50	@	00 00
Darlington of Pennsylvania			---
Cannelton Cannel			11 00
Red Bank—at Philadelphia			6 50
" —at South Amboy			7 25

Asphalts.

Albertite of New Brunswick	$21 00	@	--- 00
Trinidad Bitumen	---	@	14 00

The Penn Gas Coal Company have contracted with the PittsburghGas-Light Co. for their entire supply for the ensuing year from their Youghiogheny mines.

Within the last week contracts have been made by some of the companies in New York for about 200,000 tons of Penn, Westmoreland, Waverly, Youghiogheny, and the West Virginia caking coals—at $6 00 per ton a reduction of 50 cents from last years' prices.

Centennial Exhibition.—The following comes to us as a corrected schedule of the space allotted to the exhibitors of the thirty-four nations and their colonies who will take part in the Centennial Exhibition. The total area of the buildings will be 21½ acres:—Siam, 3946 square feet; Persia, 7776; Egypt, 7776; Turkey, 7776; Sweden, 22,000; Norway, 7500 Austria, 30,000; German Empire, 55,000; France, 63,000; Belgium, 36,000; Netherlands, 11,000; Denmark, 11,000: Switzerland, 6156; Spain and Colonies, 15,552; Great Britan, Canada, India and Australia, 100,000: United States, 166,000; Mexico, 11,664; Honduras, 3888; Guatemala, 5508; San Salvador, 4536; Nicaragua, 4536; Venezuela, 5508; Ecuador, 3888; United States of Columbia, 7776; Peru, 11,664; Chili, 9774; Brazil, 17,529; Argentine Republic, 5184; Hayti, 3888; Sandwich Islands, 3888; Liberia, 2268; Japan, 15,000; and China, 7290 square feet.—*Iron.*

Increased Water Supply Reccommended in Philadelphia.—At the last meeting of the Committee on Water of the Philadelphia Council, the ordinance for the laying of a 48-inch water main, to connect the Spring Garden and Corinthian Avenue Reservior, at a cost not exceeding $100,000, was ordered to be reported favorably. In speaking upon the subject Chief McFadden said that it should be constructed at once, or the city take its chances of a famine or a conflagration, for with so open a Winter as we have had, a drought was to be expected.

A Gas Engineer

of experience, who is a practical Mechanic, wants employment. Would lease a small Gas Works. Address GAS ENGINEER, 359 West 31st Street, N. Y. 403-1t

THE SUBSCRIBER WOULD LIKE A SITUATION AS FOREMAN, or would take charge of a small Gas Works. Address S. H. DOUGLASS, New Haven, Conn., Gas Works. 143-tf

FOR SALE,

A PURIFYING APPARATUS, CONSISTING OF A SIX inch Condenser of 24 columns, 20 feet high, with By-Pass; four Set Washers, 12 inch diameter by 9 feet high, with By-Pass; four round Purifiers 6 feet diameter by 3 feet deep; seven tiers of Trays (cast iron), Covers and Counter Balances, and one 6-inch Dry Centre Valve and Connections.

The above Apparatus is in first rate order, and will be sold cheap. For particulars address

THOS. F. KENDRICK, Sec.
Nashville Gas-Light Co.
402-4t

Brooklyn Clay Retort AND FIRE-BRICK WORKS,

VAN DYKE STREET, BROOKLYN, N. J.

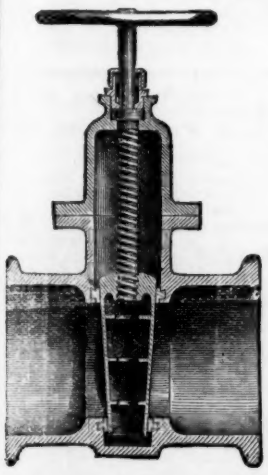
EDWARD D. WHITE, Surviving Partner of the late firm of J. K BRICK & CO. 402-1y

CHAPMAN VALVE MANUFACTURING CO.

MANUFACTURERS OF

CHAPMAN GAS VALVES.

Office and Sales Room 75 and 77 Kilby Street, Boston.

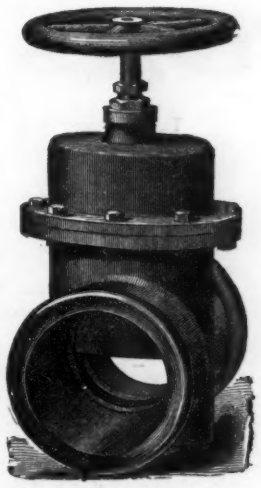


These Valves have been in use for several years, and are pronounced by all who have used them to be

The Best Gas Valves Ever Made.

They afford a direct passage the full size of the pipe. The seats are made of an alloy similar to BABBITT metal, specially prepared for the purpose, and superior to all other metals used for the seats of Gas Valves. It does not corrode under any circumstances to which it is exposed.

There is no LIABILITY OF COHESION between the Gate and Seat, and the Valves can be relied upon to SHUT TIGHT and OPEN EASILY at all times—an important desideratum when used for street mains, in cases of fire.



We refer to the following named Gas-Light Companies among the many that have used these Valves:

BOSTON GAS-LIGHT COMPANY, BOSTON, MASS.
CAMBRIDGE GAS-LIGHT COMPANY, CAMBRIDGE, MASS.
NEWTON & WATERTOWN GAS-LIGHT CO., WATERTOWN, MASS.
LAWRENCE GAS-LIGHT COMPANY, LAWRENCE, MASS.
PEOPLES GAS-LIGHT COMPANY, BROOKLYN, N. Y.
CITIZENS GAS-LIGHT COMPANY, BROOKLYN, N. Y.
SOUTH BOSTON GAS-LIGHT COMPANY, BOSTON, MASS.
CHARLESTOWN GAS-LIGHT CO., CHARLESTOWN, MASS.
LYNN GAS-LIGHT COMPANY, LYNN, MASS.
FITCHBURG GAS-LIGHT COMPANY, FITCHBURG, MASS.
CITIZENS GAS-LIGHT COMPANY, NEWARK, N. J.
WILLIAMSBURGH GAS-LIGHT CO., WIRLIAMSBURGH, N. Y.

GAS AND WATER VALVES ½ INCH TO 36 INCHES DIAMETER.
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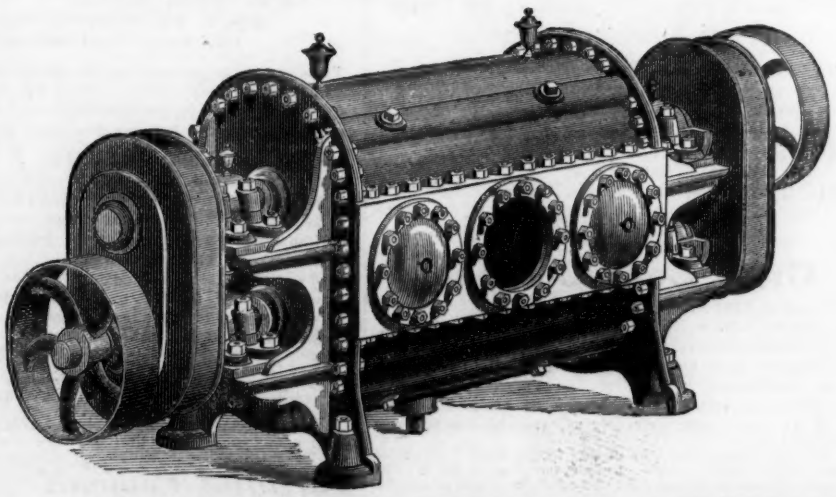
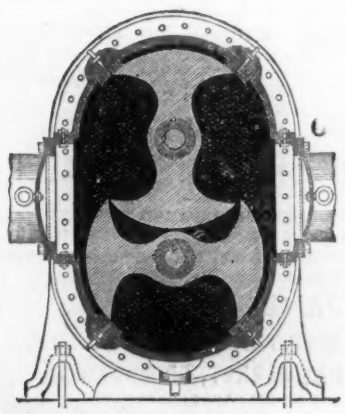
357-tf

PATENT IMPROVED GAS EXHAUSTER.





P. H. & F. M. ROOTS, PATENTEES AND MANUFACTURERS, CONNERSVILLE, IND.
S. S. TOWNSEND, GENERAL AGENT, 31 LIBERTY STREET, NEW YORK.

The following are some of the advantages we claim for this Exhauster over all others:

FIRST.—It is simpler in its mechanical construction than any other Exhauster in use.

SECOND.—The internal parts consist of only two revolvers, each cast entire in one piece, without a single screw, bolt, nut, washer, key or other part to get loose on the inside and stop or break the machine. The internal operating parts, therefore, can not get out orde and hence require no care or attention.

THIRD.—Every part of the machine requiring care or attention, as the journals, gearing, etc., is external, easily observed and attended to. All changes, adjustments, and repairs are made from the outside. The journal bearings, if necessary, can be renewed in a few minutes.

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FIFTH.—They are built in the most complete and substantial manner, with steel shafts and improved journal bearings, and their durability is almost without limit.

We build them of any required capacity, large or small, adapted to any kind of works or place.

Send for Illustrated Catalogue, giving all particulars as to capacity, speed, power required, dimensions, and price of each size and references to parties using them.

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THE
PENN GAS COAL COMPANY

OFFER THEIR

COAL, CAREFULLY SCREENED,

AND PREPARED FOR

GAS PURPOSES.

Their Property is located in the Youghiogheny Coal Basin, near Irwin's and Penn Station, on the Pennsylvania Railroad, and on the Youghiogheny River.

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Greenwich Wharves, Delaware River.
366-1y **Pier No. 1 (Lower Side), South Amboy, N. J.**

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OF WEST VIRGINIA.

Offer for sale the following Coals, from their Colliery at CANNELTON, Kanawha County, West Virginia, delivered at RICHMOND, Va.:

CANNELTON CANNEL,

cknowledged to be the most valuable ENRICHER produced in this country, a gross ton yielding 10,000 ubic feet of GAS of 64·54 CANDLE POWER; COKE 32 bushels, of good quality.

CANNELTON CAKING COAL.

Volatile Matter.	Coke.	Per cent. of Ash in Coal.	Per cent. of Ash in Coke.	Sulphur in Coke.	Sulphur in Ooti.	Sulphur in Volatile Matter.	Specif. Gravity. Coal.	Specif. Gravity. Gas.
35.1	64.9	2	6	.82	1.48	.66	1,289	.476

MAXIMUM YIELD, 5.06 cubic feet of Gas per pound of Coal—A yield of 4·78 cubic feet per lb.. —gave 16 14-100 Candle-Power.

COKE, of very fine quality—1453 pounds produced from one ton of coal.

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CANNEL COAL MERCHANT,

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ESTABLISHED 1840. 357-1y

WREN'S GAS WORKS.

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Corner of Jay and Water Streets,

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Wren's Gas Works,

and sell Licenses to use my Patents for making Gas from Petroleum.

Gentlemen of the profession:—As your consumers demand a better light, and as that demand has been in many cases sought in vain to be met by using different abortive imitations of my various processes, would it not be well to make success sure by trying the plan of the inventor.

You can enrich your Coal Gas to any desired standard, by using my process, in the simplest manner, and much cheaper than by *any other* method. Address as above. 397

THE NEWBURGH

Orrel Coal Company,

Mines at Newburg, Preston County, W. Va.

Company's Office, No. 52 S. Gay Street, Baltimore, Md.

C. OLIVER O'DONNELL, Pres't. CHAS. MACKALL, Sec'y.

CHAS. W. HAYS, Agent in New York, Room 7, Trinity Building, 111 Broadway.

SINCLAIR & AGNEW, Agents, Alexandria, Va.

This Company offer their very superior Gas Coal at lowest market prices.

It yields 10,996 cubic feet of gas to the ton of 2,240 lbs. of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York; the Brooklyn and Citizen's Gas Light Companies of Brooklyn, N. Y.; the Baltimore Gas Light Company of Baltimore, Md., and the Providence Gas Light Company, Providence, R. I.

Best dry coals shipped from Locust Point, wharves, and prompt attention given to orders for chartering of vessels.

224-1y n

THE DESPARD COAL COMPANY

OFFER THEIR SUPERIOR

DESPARD COAL

To Gas Light Companies throughout the country.

Agents, PARMELEE BROTHERS, No. 32 Pine street, N. Y.

BANGS & HORTON, No. 31 Duane street, Boston.

Mines in Harrison County, West Virginia.

Wharves Locust Point, Company's Office, 15 German St., } Baltimore.

Among the consumers of Despard Coal, we name: Manhattan Gas Light Company, New York; Metropolitan Gas Light Company, New York; Jersey City Gas Light Company, N. J.; Washington Gas Light Company; Portland Gas Light Company, Maine.

*** Reference to them is requested. 204-1y

NEW YORK AND CLEVELAND
GAS COAL COM'Y

Of Pittsburgh, Pa.

MINERS AND SHIPPERS OF

YOUGHIOGHENY GAS COAL.

This Company is prepared to furnish any amount of the justly celebrated, and acknowledged superior GAS COAL, to any point reached by railroad or navigation, on most favorable terms.

General Office—384 Penn Avenue, PITTSBURGH, PA.

Branch Office—C. & P. RR. Coal Pier, CLEVELAND, OHIO.

WILLIAM A. McINTOSH, President.
A. CARNEGIE, Vice-President.
W. P. DE ARMIT, Treasurer.
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W. H. WATERBURY & CO., General Sales Agents, 187 Broadway, New York.
251-1y

PEYTONA
CANNEL COAL

From West Virginia.

Yields over 13,000 feet of Gas per ton. At ten thousand feet (standard yield) the illuminating power is over 43 candles. Purifies 4,510 feet to the bushel of lime.

S. E. LOW, Secretary,
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OFFICE OF THE

NATIONAL COAL GAS COMPANY,

No. 4 Warren Street, New York.

H. P. ALLEN, President.
I. B. BRICE, Vice-President.
A. H. ALLEN, Secretary.
WM. J. VALENTINE, Treasurer.
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This Company is the owner of the GWYNNE-HARRIS, or AMERICAN HYDROCARBON process, for making Gas for Lighting or Heating purposes, by the perfect decomposition of superheated steam, under what is known as the

GWYNNE AND HARRIS PATENTS.

This process has been fully tested nearly 50,000,000 cubic feet of Gas having been made under it, and fully demonstrating the fact that it is the greatest improvement ever made in the manufacture of Gas, either for Lighting or Heating purposes. With half a ton of Anthracite Coal 150,000 cubic feet of Gas per day is made from three benches, and the labor is so small that one man can attend three or four benches.

The process can be put into either Coal or Oil Gas Works (or where both Coal and Oil are used) at small cost, without any interruption to the working of other benches. The Citizens Gas-Light Company of Brooklyn, after using it for more than seven months, have found it not only far better, but actually *cheaper* than atmospheric air in making Gas, with the use of "petroleum and its products."

Further information, and terms of sale of rights will be given, upon application to the Company 348-1y

Portland Cement,
Roman Cement,
Keene's White Cement,

NUMBERS 1 AND 2.

From best London Manufacturers.

FOR SALE BY

S. L. MERCHANT & CO.,

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Corner Maiden Lane. 344-1y

☞ Remit 10 cents postage for "Practical Treatise on Cement."

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GAS ENGINEER,

914 OLIVE STREET, ST. LOUIS, MO.

355-

THE WAVERLY COAL AND COKE CO.

Offer for Sale the

YOUGHIOGHENY COAL

DOUBLE SCREENED,

from their Colliery at Smith's Mills, on the Youghiogheny River, thirty-seven and a half miles southerly of Pittsburgh. This Coal has the preference in Pittsburgh over all other YOUGHIOGHENY COAL for GAS PURPOSES.

The facilities of the WAVERLY COMPANY are unsurpassed by those of any other Company on the Youghiogheny.

Full particulars can be had by addressing

PERKINS & JOB, Agents,
27 South Street, New York.
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1852 TROY, N. Y., 1876.

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OF THE GENUINE

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Coke Shovels,

WITH EITHER

Long or D Handles.

WELL KNOWN AMONG

The Principal Gas Companies throughout the Country.

PRICES REDUCED, and Shovels delivered in New York per lots of one dozen or more.

Orders solicited. 399–6

MITCHELL, VANCE & CO.,

Manufacturers of

CHANDELIERS!

And Every Description of

GAS FIXTURES,

Also Manufacturers of

Fine Gilt Bronze and Marble Clocks, warranted best Timekeepers, Mantle Ornaments, &c.

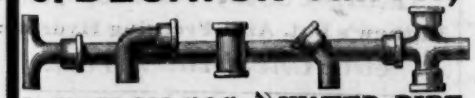
Salesroom, 597 BROADWAY,

Rear Entrance 140 Mercer Street,)

NEW YORK.

Special designs furnished for Gas Fixtures for Churches, Public Halls, Lodges, &c.

S. DECATUR SMITH,



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Foundry, Cor. of York and Moyer Streets,

PHILADELPHIA.

Several Thousand 2, 3, 4, 6 and 8 Inch Cast Iron *Gas and Water Pipes* on hand, for immediate delivery.

FITTINGS FOR GAS AND WATER MAINS.

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LAVA TIPS AND SCOTCH TIPS.

ALL ORDERS DELIVERED FREE TO NEW YORK.

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JERSEY CITY, N. J.

MANUFACTURERS OF

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ALWAYS ON HAND.

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FOR WATER AND GAS,

ALSO,

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OF EVERY DESCRIPTION,

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AND PARTIES ENGAGED IN THE BUILDING OF

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J. D. PATTON,

363–unl Treverton, Northumberland Co. Pa.

FOR SALE,

200 Tons
CANNEL CHIPS.

Address **H. E. HOY,**

34 New Street, N. Y.

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American Meter Co.—West 22nd st., N. Y., Arch and 22d st., Phil., 548 Washington st., Boston.... 1
Cast Iron Gas and Water Pipe—S. Decatur Smith, York and Moyer streets, Phila., Pa.
Cast Iron Gas and Water Pipes—R. D. Wood & Co., Philadelphia Pa. 16
Cast Iron Gas and Water Pipe—Jno. McNeal & Sons, Burlington, N. J.
Franklin Foundry and Pipe Works—Jas. Marshall & Co., 23 Nineteenth street, Pittsburgh, Pa.
Gas Valves (Chapman) 75 and 77 Kilby st., Boston, Mass.
Gas-Burners—C. Gefrorer, 248 North 9th st., Phila., Pa.
Gas Purification—St. John and Cartwright
Gas Meters, etc.—Harris, Griffin & Co., 12th and Brown streets, Phila., Pa. 10
Gas Meters, etc.—Wm. W. Goodwin & Company, 1012 Filbert street, Phila, Pa. 17
Gas Meter Manufacturers—Harris & Bro., 1117 Cherry st., Philadelphia, Pa. 11
Gas Fixtures, Etc.—Mitchell, Vance & Co., 597 Broadway.
Clay Gas Resorts, etc., etc.—J. H. Gautier & Co., cor Greene and Essex streets, Jersey City, N. J.
Gasholders, Etc.—Delly & Fowler, 39 Laurel st., Phila., Pa.
Gas Screen—James P. Mahon, Boston, Mass.
Lime Hurdles.—Manhattan Lime Hurdle Co., Geo. W. Day, Treas., No. 3 Railroad Square, Haverhill, Mass.
Lava Tips and Scotch Tips—Charles H. Meyer & Co., 227 Chestnut street, Phil. Pa.
National Tube Works Co., 78 William St., N. Y.
Patent Conically Slotted Wood Trays—John L. Cheesman, 147 and 149 Avenue C., N. Y.
Patent Gas Exhauster—Smith & Sayre, 95 Liberty street.
Pelouze & Audouin Condenser—Jas. R. Smedberg, Sole Agent for U. S. San Francisco, Cal.; Henry Cartwright, 2107 Green street, Phil. Pa.
Petroleum Gas—J. D. Patton, Treverton, Pa.
Patent Gas Exhauster—S. S. Townsend, Agt., 31 Liberty street, N. Y.

GAS COALS

Cannelton Coal Co. of West Virginia—J. Tatnall Lea, 325 Chestnut street, Phila, Pa.
Despard Coal Co.—Parmelee & Bros., Agents, 32 Pine st., New York. 7
Gas Coals—Perkins & Job, 27 South st., N. Y. 7
New York and Cleveland Gas Coal Company—384 Penn Avenue, Pittsburgh, Pa. 6
Penn Gas Coal Co.—11 Merchants' Exchange, Phil. and 90 Wall street, N. Y. 6
Peytona Cannel Coal—S. E. Low, 58 Broadway, N. Y. 5
The Newburg Orrel Coal Co.—Chas. W. Hays, Agent in New York, Trinity Building, 111 B'way, Room 7. 6
Tyrconnell Gas Coal—52 S. Gay Street, Baltimore, Md. 6
Westmoreland Coal Co.—230 South 3rd Street, Phil. Pa. 4
Youghegheny Coal—Perkins & Job, 27 South St N. Y. 7

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Atlantic Dock Iron Works—John P. Kennedy, Office 98 Liberty street, N. Y., P. O. Box 2348.
Cast-Iron Pipes and Fittings—B. S. Benson, 52 East Monument street, Baltimore, Md.
Continental Works—T. F. Rowland, Greenpoint.
Camden Iron Works, Camden, N. J.—Jesse W. Starr & Son.
Gloucester Iron Works—J. P. Michelon, Sec., 6 North 7th street, Phila., Pa. 4
Mill Street Foundry.—Geo. Stacey & Co., Cincinnati. O. 5
National Foundry and Pipe Works—Wm. Smith, Carroll, Pike, Smallman & Wilkins streets, Pittsburg, Pa.
Oregon Iron Foundry—Herring & Floyd, 740 Greenwich street, N. Y. 10
Pascal Iron Works—Morris, Taskar & Co., Philadelphia. 12
Providence Steam and Gas Pipe Co., Providence, R. I.—H. A. Branch, Agent. 3

WATER METERS, PUMPS, ETC.

Cast Iron Pipes for Water and Gas—Riley A. Brick, 112 Leonard street, N. Y. 10
Valves for Water, Steam and Gas—Ludlow Valve Man'g Co., 940 River street, Troy, N. Y. 6

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Cheltenham Fire Brick and Clay Retort Works—Evens & Howard, 916 Market street, St. Louis, Mo. 8
Manhattan Clay Retort Works, 15th st., near Av. C, N. Y. 8
Philadelphia Fire Brick Works, Vine and 23d sts., Phila. 8

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Lamps—M. B. Dyott, 114 South 2nd Street, Phil. Pa. 1
Patent Lamp Post—J. W. Graham, Chillicothe, Ohio, or A. M. Callender, office of this Journal.

MISCELLANEOUS.

Analysis and Testing of Gas Coals—Prof. Henry Wurtz, 12 Hudson Torrace, Hoboken, N. J. 10
Architect and General Gas Engineer—William Farmer, 111 Broadway Room 95, N. Y.
Brass Cocks, Plumbers' Materials, etc., etc.—McNab & Harlin Manufacturing Co., 56 John st., N. Y. 7
Cements—S. L. Merchant & Company, 76 South st., N. Y.
Contractors for Gas Works, Etc.—Murray & Baker, Fort Wayne, Ind. 2
Fodell's System of Bookeeping—A. M. Callender & Co., 42 Pine st., New York. 1
Gas Engineer—B. E. Chollar, 914 Olive St., St. Louis, Mo.
Gas-Light Company of America, 63 and 64 Drexel Building, New York. 2
Kidd's Gas Consumers Guide—A. M. Callender & Co., 42 Pine Street, N. Y.
Massachusetts Institute of Technology—Samuel Kneeland Boston, Mass.
National Coal Gas Company—H. P. Allen, 4 Warren street New York.
School of Mines, Columbia College, East 49th st. 9
Screening Shovels—Herring & Floyd, 740 Greenwich st., New York. 10
Scientific and Practical Chemist and Geologist—Profetsor Henry Wurtz, 12 Hudson Terrace, N. J. 7
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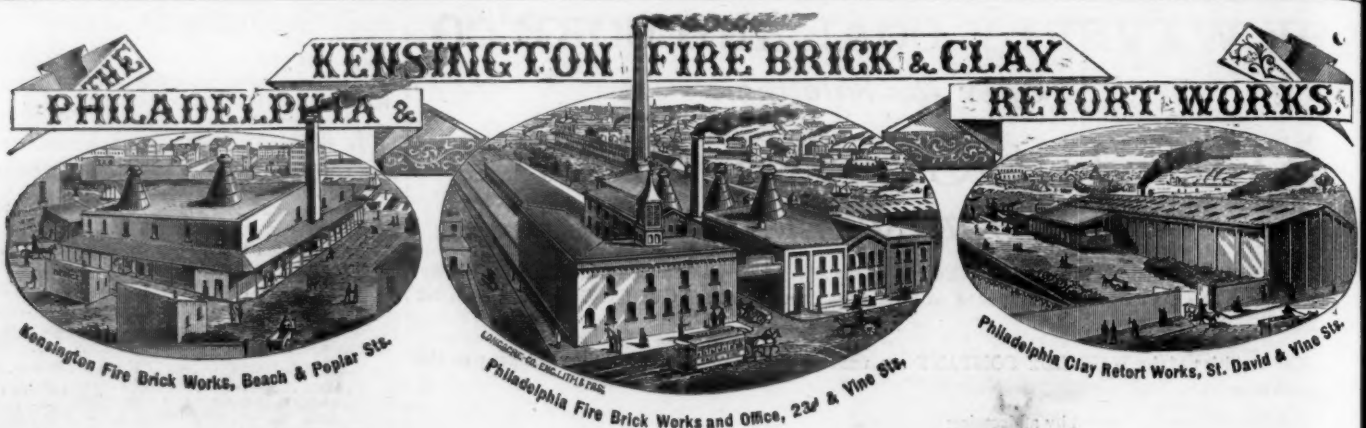
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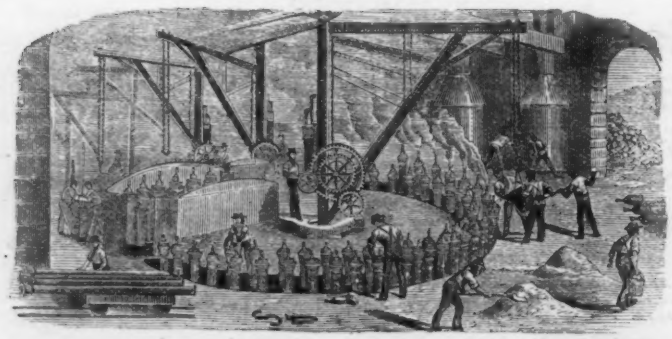

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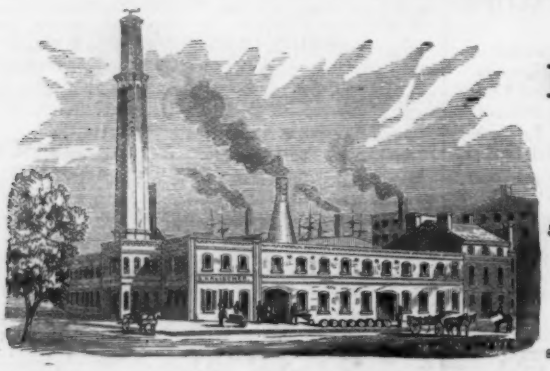
FOR WATER AND GAS.



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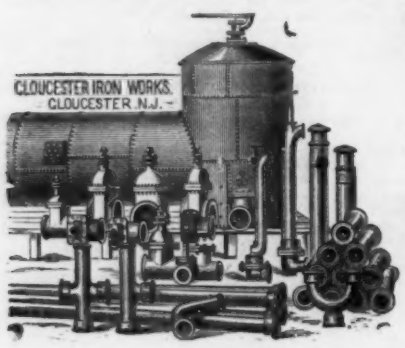

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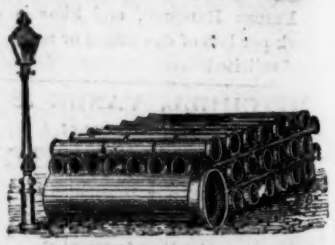

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Pipes from 3-inch and upwards cast in 12 ft. len
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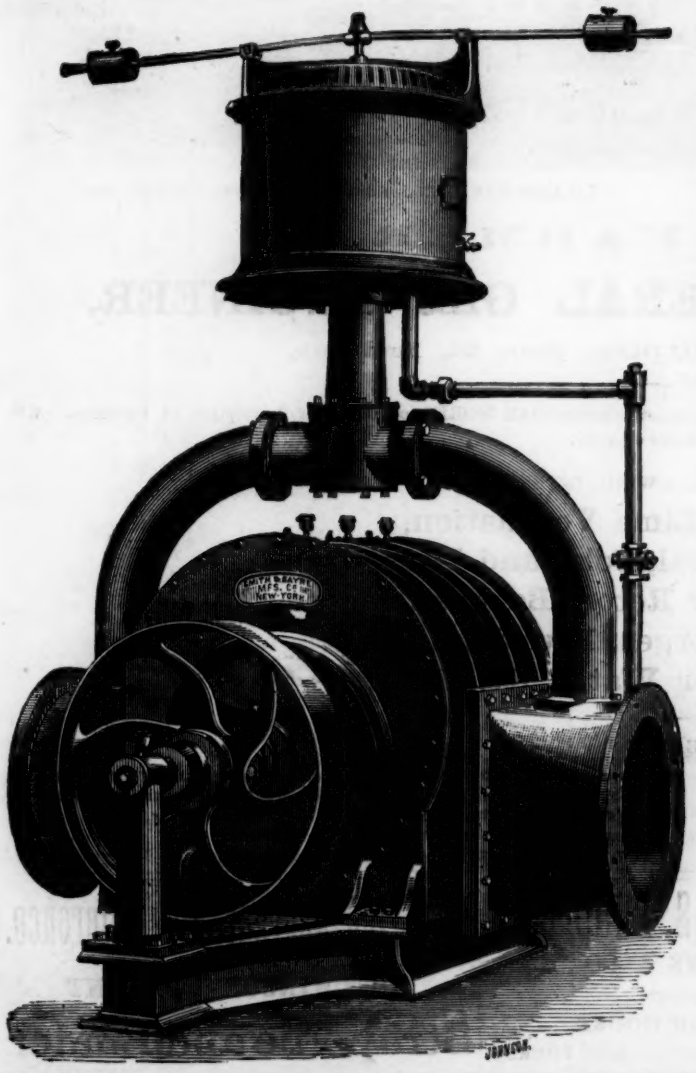
The Mackenzie Patent Gas Exhauster

And Patent Compensator.



They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-jo ints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

We are also sole proprietors and manufacturers of the

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The Blower is a Force Blast machine, durably built, and can be driven with one-third the power required to drive the ordinary fan

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Nos. 63 and 64 Drexel Building,

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THE GAS-LIGHT COMPANY OF AMERICA, owners of the Patent Processes for making ILLUMINATING GAS from PETROLEUM and its products, known as the

Gale and Rand

AND

Wren and Barker Patents,

are prepared to treat with Gas Companies and Manufacturers of Gas for the use of said processes.

An examination of the merits of these inventions as demonstrated by practical experience in a large number of Gas Works employing them, will not fail to convince the intelligent Gas Manufacturer of the great advantages derived from their use.

Gas of unexceptional quality, of high illuminating power is made at many of these works by these processes, at a cost of from 40 per cent. to 60 per cent. less than an ordinary quality of illuminating gas can be made by any other methods in use. Gas Companies generally may easily, and at small outlay for making the necessary changes in manufacturing apparatus, double their net earnings, and supply a much better light to their patrons, at greatly reduced prices.

The Company respectfully refer to Companies using these processes in this city, Reading, Penn., Chicago and elsewhere, and especially to the Mutual Gas-Light Company of Detroit, Mich., whose works more nearly conform in all details of construction to the original plans of the inventors than those of other Companies.

For Correspondence, etc., address to office as above.

CHARLES F. DEAN, Secretary.

1842. DEILY & FOWLER. 1876.

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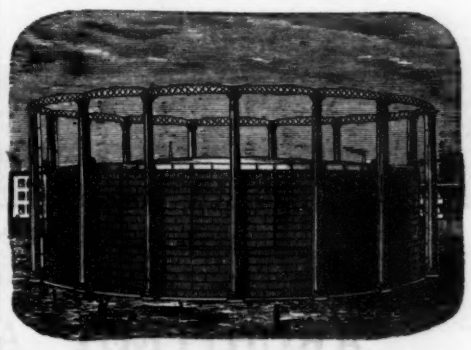

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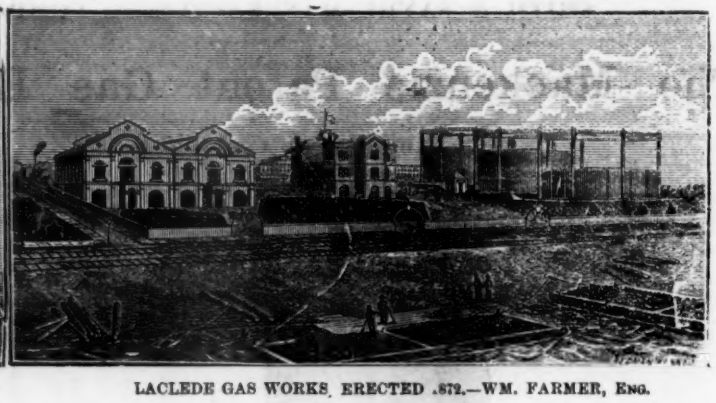

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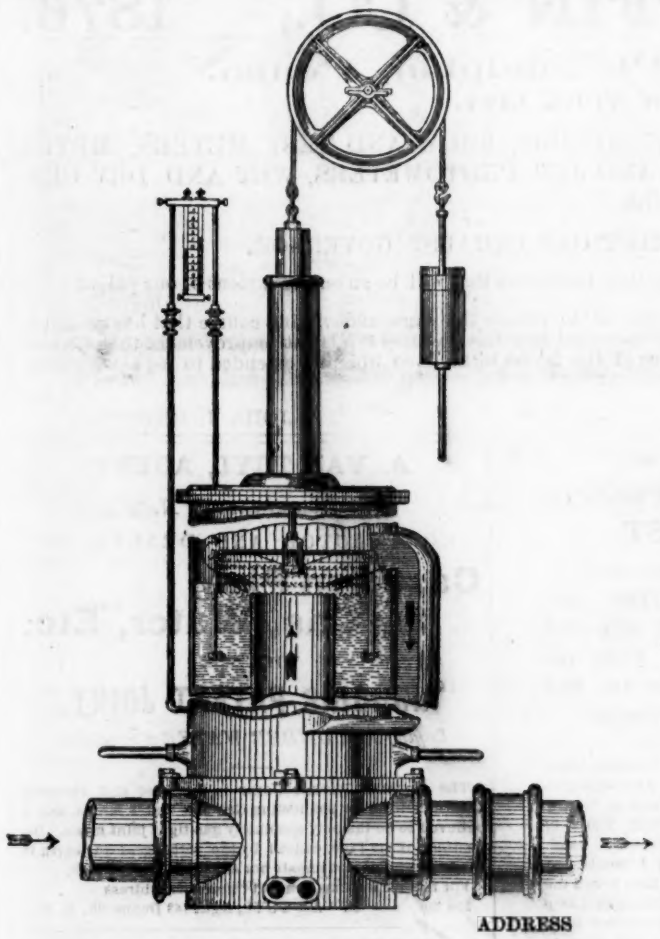

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MORRIS, TASKER & CO., Limited.

PASCAL IRON WORKS, PHIL'A.

DELAWARE IRON CO., NEWCASTLE, DEL,

OFFICE, NO. 209 SOUTH THIRD STREET, PHILADELPHIA.

Office and Warehouse, 15 Gold Street, New York.

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WROUGHT IRON ROOF FRAMES.—For Slate, or Corrugated Iron Coverings, with Cast Iron Cornice Gutter. Iron Doors and Frames, Wrought Iron Pivot Blinds, Windows and all kinds of Castings and Smith Work for Buildings.

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Sole agents and manufacturers of Morton and Holman's, and Munzinger's **Patent Self-Sealing Retort Lids.**

Manufacturers of **Wrought Iron Welded Tubes,** Plain, Galvanized and Rubber Coated, for Gas, Steam, and Water.

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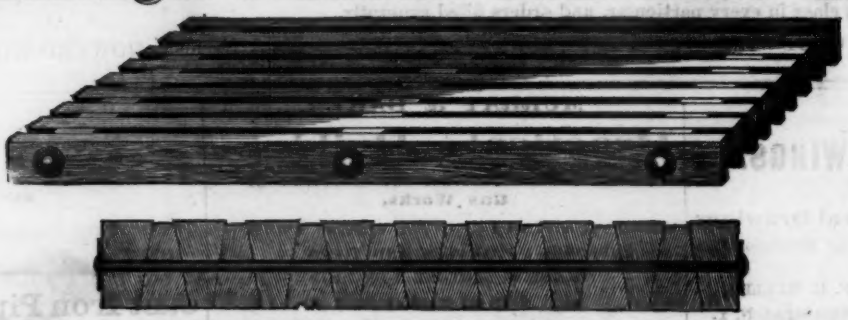

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Erie Gas Company, Pa.
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